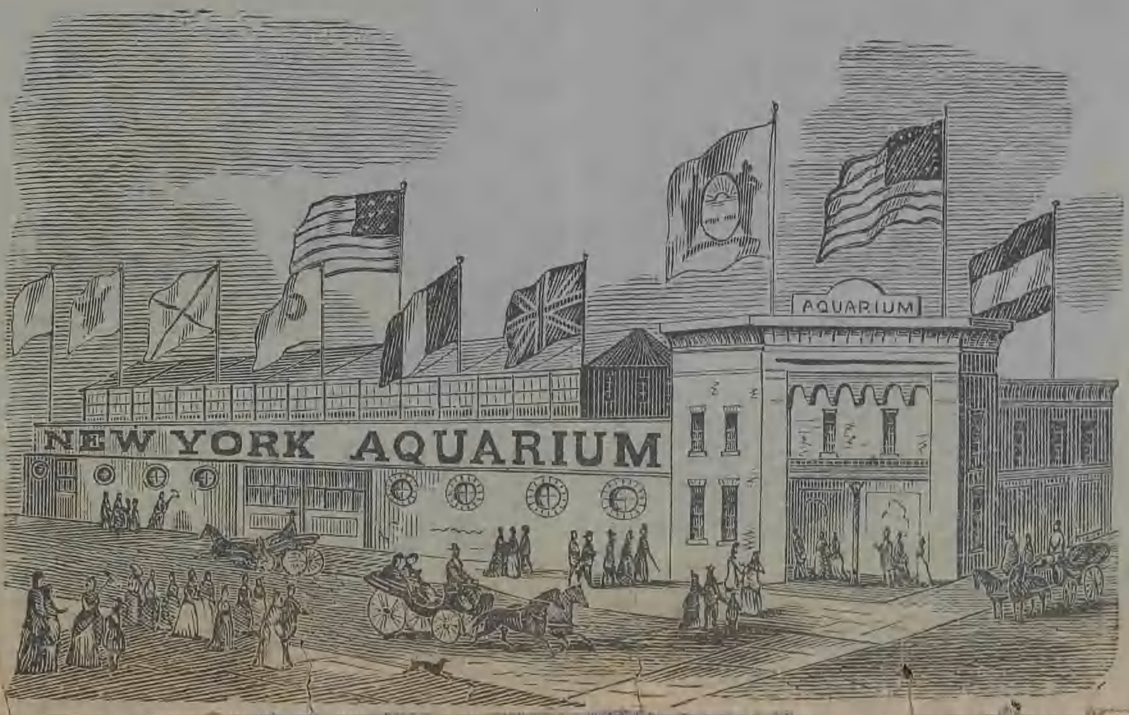
New York Aquarium



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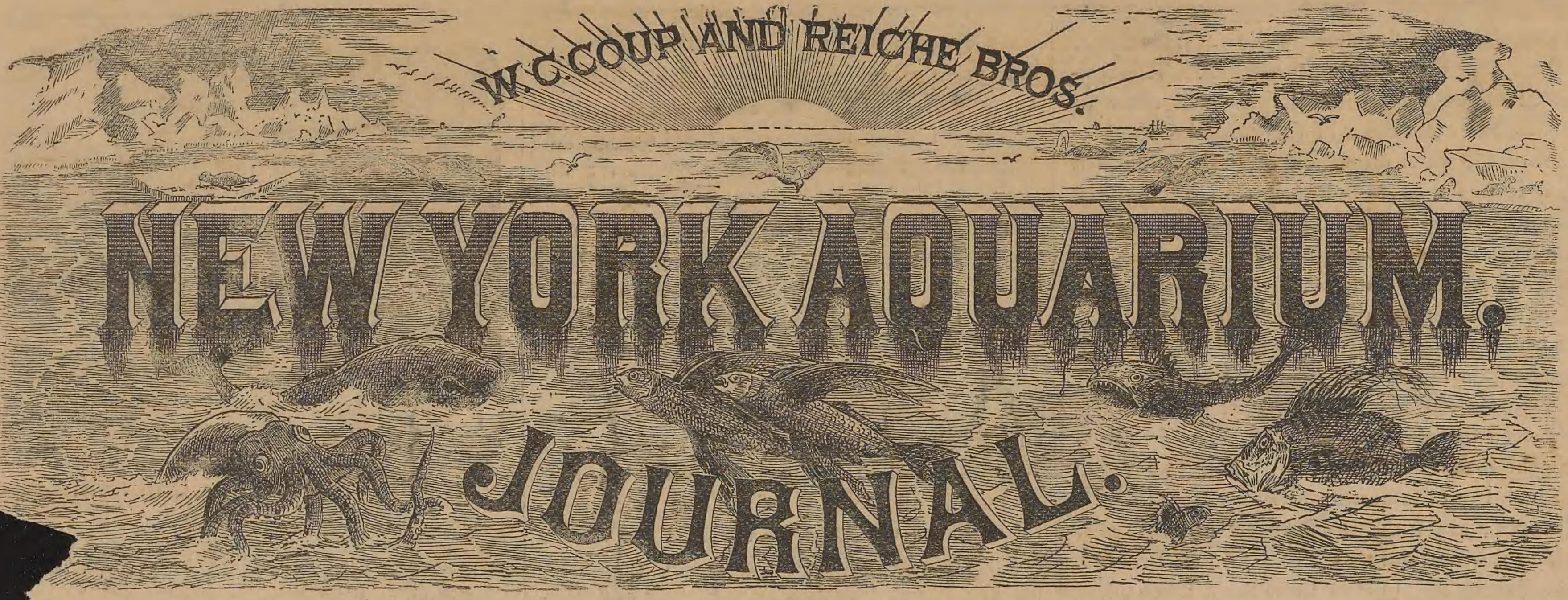

W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM JOURNAL.

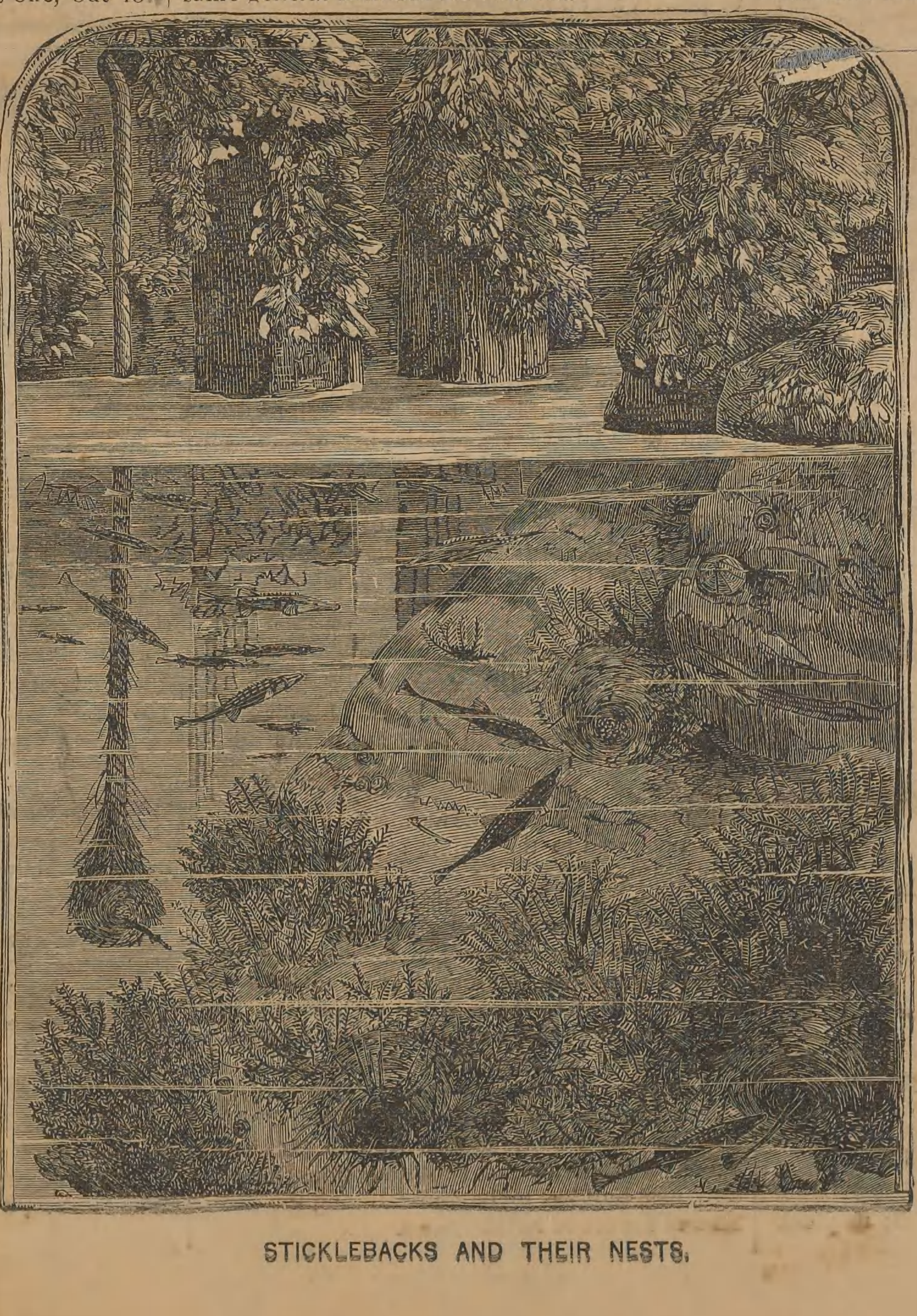
Published Semi-Monthly at the New York Aquarium, cor. 35th Street and Broadway.

VOL. 1. NEW YORK, WEDNESDAY, OCT. 11, 1876. NO. 1.

THE STICKLEBACK AND HIS NEST.

It is not without good and worthy reasons that the place of honor on this, the first page of the initial number of the Aquarium Journal, is given to an illustrated description of the odd little Stickleback and his submarine home. It will not be denied that the Whale is a bigger fish and the Octopus a more famous one, but for consummate skill and ready wit the plucky and ingenious little fish known as the Stickleback—or as the wise heads have christened it, "Gasterosteus"—leads them both and all the rest of the water world beside. Though we have registered a vow to avoid in these and all subsequent descriptive papers all bewildering technical terms and titles, yet we should be lacking in due respect for the intelligence of our readers did we not believe that what is now written will lead to further inquiry, and therefore shall take it for granted that they will desire to know all and even more than we can tell regarding the subjects of the present series of submarine sketches.

The Sticklebacks belong to the order of Spine-finned Fishes known scientifically as Acanthopterygii, and in which the rays of the fins are in the form of spines. As the New York Aquarium tanks contain living specimens of these fish it is left for the visitors to learn of their form and structure by direct personal observation, and we pass at once to a notice of the one great accomplishment which places the Stickleback far in advance, so far as intelligence goes, of all rivals both great and small. The accomplishment to which we refer is that by which this fish is able to build a nest for the home and protection of its young, or rather for the eggs or spawn from which the young are hatched. The illustration here given will serve as a guide to a brief description of the methods adopted by these house builders of the sea. The nest is very like that built by certain birds, and in the plan of construction the same general methods are adopted.



STICKLEBACKS AND THEIR NESTS.

Having first chosen the site, which may be some secluded little moss-covered retreat among the pebbles or the branches of some hardy sea plant, the worker begins the collection and arrangement of the materials out of which the nest is made; these consist of the delicate little leaves and branches of sea weed which abound in all ponds, lakes, or even in the great ocean. With these the work of nest building is begun and completed—the only instrument used being the mouth and active little nose of the builder. First comes a bit of tangled weed for a foundation, which is held in place, it may be, by some bits of straw that a favoring breeze has cast upon the water, and which serves in the place of tie beams and rafters. By the aid of these few simple materials, many of them brought from a distance in the mouth of the builder, the nest is completed, and when finished has the appearance of a little green puff ball or thistle bud. On one side, or at the top, a small opening is left, and within is a soft green bed for the reception of the eggs. These eggs, when first laid, are of a yellow color and about the size of the smallest dust shot or poppy seeds. As they approach maturity they turn to a darker color. Mr. Couch, in his History of British Fish, gives a very interesting account of personal observations which but serve to confirm the claim we have set up for the superior skill and wisdom of the Stickleback. He tells us that in a large dock for shipping on the river Thames thousands of Sticklebacks were bred, and he often amused himself for hours observing them. While multitudes were enjoying

DSI

themselves near the shore in the warm sunshine, others were busy making their nests. This consisted of the very minutest pieces of straw or sticks, the exact color of the ground at the bottom of the water on which they were laid, so that it was next to impossible to discover the nest unless they saw the fish at work, or observed the eggs. The nest is somewhat larger than an English shilling and has a top or cover with a hole in the centre, about the size of a hazel nut, in which are deposited the eggs or spawn. This opening is frequently covered or concealed by drawing small fragments over it. It was also observed that the fish used great force in conveying the material to the nest. When it was about an inch from the nest it suddenly darted towards the spot and left the tiny fragment in place, after which it would devote a half a minute or more in adjusting it. One of these nests, when taken up, hung together like wool. In other cases, however, where the materials used in its construction are more delicate, the nest will not bear removal, but when taken from the water falls together like a tangled ball of fine thread.

It sometimes happens that the STICKLEBACK, like the Sparrow and Wren, avails itself of special contrivances for aiding it in its work. An instance of this came under the notice of the observer above named, and is shown in the accompanying illustration. Here a pair of STICKLEBACKS are described as having made their nest in the loose end of a rope, from which the separate strands hung out about a yard from the surface, over a depth of four or five fathoms, and to which materials need only have been brought in the mouth of the fish from a distance of about thirty feet. The nest was formed of the usual aggregation of the finer sorts of green and red sea weed, but these were so matted together in the hollow formed by the untwisted strands of the rope that the mass constituted an oblong ball such as shown in the illustration, and about the size of a large egg. In this had been deposited the scattered assemblage of spawn, and the whole was bound together with a thread of animal substance which passed through and through in various directions, while the rope itself formed an outside covering. In the case of the FIFTEEN-SPINED STICKLEBACK, the eggs, which are very large and of an amber color, are not placed within the nest but distributed in little pockets throughout the mass.

If the STICKLEBACK displays an unusual skill and ingenuity in the construction of its nest, it is equally active and zealous in the defense of its home and the protection of the treasure it was designed to contain. WOOD informs us that when the STICKLEBACK has fixed upon a spot for his nest he seems to consider a certain area around as his own special property, and will not suffer any other fish to intrude within its limits. He will even dash at a fish ten times his size and by dint of his fierce onset and bristling spines drive away the enemy. If a cane or branch be lowered within their domain the faithful and brave guardian of his home will dash at it with a force that may be felt along its whole length.

Did space and the reader's patience permit, we might devote columns to the stories relating to the aggressive character of this fish; its pluck when contending against great odds; its exultant pride when victorious, and its humility and shame when vanquished. A single instance of one of these mortal combats between two STICKLEBACKS as recorded by an observer will suffice to illustrate their characteristic.

The two antagonists dart at each other with spears in rest; snap at each others gills or head and retain their grasp with the tenacity of a bull dog. They whirl round and round in the water; then drop, feint, attack and retreat with astonishing rapidity, until one confesses himself beaten and makes off for shelter—the conqueror snapping at its tail and inflicting a parting bite. Now is the time to see the triumphant little creature in all the glory of his radiant apparel, for with his conquest he assumes the victor's crown; his back glows with shining green, his sides and head are glorious with gold and scarlet and his belly is silvery white. If it could only be enlarged from its natural size of between one and five inches in length, according to species, to the size of a large perch it would, under these conditions, rival in brilliance of color the most gorgeously-hued of tropical fish.

In closing we are prompted to give an instance which will add to the already distinguished honors which have been won by this worthy member of the finny tribe. We refer to its superior intelligence as an observer, and the case is peculiar as serving to prove that fish, like other animals, can "put this and that together," and are possessed of certain reasoning qualities or powers allied to reason.

Several years since PROF. H. D. BUTLER, the present Superintendent of the New York Aquarium, was the fortunate possessor of a number of these odd fish which he kept in a small Aquarium tank, watching over and feeding them with a naturalist's care and zeal. It at length occurred to him to attempt to train his pets, as he had done the greater Whales and Seals. For this purpose he arranged on a little platform over the tank a small silver bell, the cord attached to which he lowered into the water. At first he would fasten to the lower end of this cord a small portion of food or bait. As the STICKLEBACKS rushed for this in their mad fashion, the result would be a violent ringing of the bell above. At this signal the Professor would draw up the line and attach more food, until the fish learned to connect the ringing of the bell with the hastening or renewal of their repast, and would thus, of their own accord, and without other instructions save those gained by experience, signal to their benefactor and friend when the hour of feeding approached. This instance, we need hardly add, is vouched for by PROF. BUTLER, who purposes to continue his observations on this subject with these and many other fish now under his charge. Should he be equally successful a second time, the fish bell-ringers will prove one among the numberless attractions now presented to the visitor at the New York Aquarium.

Before dismissing the subject we would add that the Guide to the Aquarium, now in course of preparation, is designed to furnish such detailed descriptions, illustrated and otherwise, as may be needed by those of the visitors who desire to become more fully informed regarding the technical peculiarities of the many and curious species of fish there shown. For this reason we refrain from any more extended reference to the several species of STICKELBACKS, which, with but one or two exceptions, are the only nest-builders to be found among the denizens of the sea or its tributaries.

THE PHILOSOPHIC CHICKEN.

Most strange!
Most queer,—although most excellent a change
Shades of the prison-house, ye disappear!
My fettered thoughts have won a wider range,
And, like my legs, are free;
No longer huddled up so pitiably:
Free now to pry, and probe, and peep and peer,
And make these mysteries out.
Shall a free-thinking chicken live in doubt?
For now in doubt undoubtedly I am:
This problem's very heavy on my mind,
And I'm not one to either shirk or sham:
I won't be blinded, and I won't be blind!
Now, let me see;
First, I would know how I got in *there?*
Then, where was I of yore?
Besides, why didn't I get out before?

Bless me!
Here are three puzzles (out of many more),
Enough to give me pip upon the brain!
But let me think again.
How do I know I ever *was* inside?
Now I reflect, it is, I do maintain,
Less than my reason, and beneath my pride
To think that I could dwell
In such a paltry, miserable cell
As that old shell.
Of course I couldn't! How could *I* have lain,
Body and beak and feathers, legs and wings,
And my deep heart's sublime imaginings,
In there?

I meet the notion with profound disdain;
It's quite incredible; since I declare
(And I'm a chicken that you can't deceive)
What I can't understand I won't believe.
Where *did* I come from, then? Ah! where, indeed?
This is a riddle monstrous hard to read.
I have it! Why, of course,
All things are moulded by some plastic force
Out of some atoms somewhere up in space,
Fortuitously concurrent anyhow:—
There, now!
That's plain as is the beak upon my face.

What's that I hear?
My mother cackling at me! Just her way,
So prejudiced and ignorant, *I* say;
So far behind the wisdom of the day!

What's old I *can't* revere.
Hark at her: "You're a little fool, my dear,
That's quite as plain, alack!
As is the piece of shell upon your back!"

How bigoted! upon my back, indeed!
I don't believe it's there:
For I can't *see* it; and I do declare,
For all her fond deceivin',
What I can't see, I never will believe in!

Leisure H

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

It is the way with the world that when we who live in it wish to make friends with each other, we must first tell who we are, what we want and where we come from. Now, this is easy enough, or should be, if there is some kind friend to introduce us, or it we speak the same language and so can introduce ourselves. But what if the old man in the moon should slip off some day, and come tumbling down among us; and what it he could not speak English or German or French or anything, then it seems to me the old gentleman would have a hard time of it.

By this time the young friends of Uncle Octopus may be wondering what he is talking about, and what all this rubbish about the man in the moon means, and, worst of all, who and what is Uncle Octopus anyway? Well, the truth is that this new uncle of yours does not know exactly what or who he is himself, and so, like the man in the moon, he finds it hard work to introduce himself to you. He knows he is odd looking as you will see when he shows you his picture some day, and he knows too that his ancestors lived in a world called the sea, which is more wonderful than the moon if not so distant. In fact the more he thinks of it the more this odd looking uncle is satisfied to have his nephews and nieces go to the Aquarium themselves and see if they can find anyone answering to the name of Octopus, and if he is there he begs them not to think him so ugly as he looks.

Nor are all the other sea folk as ugly as he, for in this same Aquarium, corner of 35th street and Broadway, you will see such wonderful and beautiful creatures as you never saw before. Here are great caves filled with water, which is kept from running out by large glass walls, and in these caves you will see big fish and little fish, lobsters and crabs, sharks and sticklebacks, and so many, many more, that you will soon wish that you too were fishes with fins, that you might swim about in the clear, cool water, and never be bothered with school books or have to carry umbrellas when it rained. Now it is about this water world and all its wonders that you are to be told, and some of the stories will make you open your eyes, even when it is time you were all abed and asleep. One of these stories you shall have now, as it is told in rhyme by a friend of children who says that if it did not happen it might have happened, for all she knows, and this is just as good. If you will read all that is on this page you will read this story of Life Under the Ocean Wave, and then if you come to the Aquarium in time you will receive a beautiful book with pictures of Prince Whale and his Army.

Now, my young friends, I must stop while Madge Elliot tells you the story, and when she has done we will wait two weeks for another, and when you have heard all the wonderful facts and fancies about fish, you will know more and think better of UNCLE OCTOPUS.

LIFE UNDER THE OCEAN WAVE.

WRITTEN EXPRESSLY FOR THE AQUARIUM JOURNAL.

MADGE ELLIOT.

1.

Once there was great commotion,
In the kingdoms of old ocean,
Where fishes, big and little, good and naughty, play and roam;
Where the Sturgeon and the Star-Fish,
And all other things that are fish
And some that aren't, exactly, have their happy, briny home.

2.

A big net had descended—
Where it began and ended,
So mighty 'twas, the sharpest fish could not contrive to see—
The Blue Shark tried to break it—
How he did pull and shake it!
But he couldn't stir a single cord, so had to let it be.

3,

Said Miss Nautilus, "Good gracious
Now isn't this audacious?
Let's tell his Royal Highness, the jolly Prince of Whales,"
And away went Shad and Tunny,
Crabs, Turbots, Urchins funny,
All, except the lazy Sun-fish, to unfold their moving tales.

4.

And the reason why the Sun-fish,
The snub-nosed. queer-eyed Sun-fish,
Didn't join the dashing party in silver, green and gold
(Indeed, you may believe it,
As honest truth receive it,)
He is naught but head and shoulders and had no tail to unfold!

5.

Upon his throne of coral
In very fine apparel
Sat the Prince, his crown upon his head, his faithful Dog-fish near.
"With your Majesty's permission"—
Flounder handed a petition,
His Highness opened wide mouth—it stretched rom ear to ear!

6.

As he read he lashed the waters;
"Now by my sons and daughters"
He roared at last, "I'll stop this thing or else I'll blow no more.
Whence comes this net to fright you,
That Blue Shark cannot bite through.'
Is it from side of vessel dropped, or cast out from the shore?"

7.

Oh! dear how he did frown, "Sir,
It fell so quickly down, Sir,"
The trembling fish replied, "'tis strange we were not all shut in."
"Whence comes it?" "No one knows, Sir."
"*We* can that fact disclose, Sir."
And Walking-fish and Climbing-perch came forward, fin in fin.

8.

"From vessels and from shores, Sir,
From boats with sails and oars, Sir,
From diving bells the nets are thrown—we've seen the men at work—
And they're searching for the fairest,
The queerest and the rarest
Of sea-born things to bear them to the City of New York."

9.

"There Coup will them imprison,
And Reiche say they're his'n,
(In schools of fish, I grieve to say, no grammars ever come)
And they will pine and languish
And strangers mock their anguish
In a place these cruel men have built, called an Aquarium."

10.

Prince Whale then blew and spouted—
"These minions shall be routed;
Red Trumpet-fish sound the alarm—let Flying-fish appear
To lead the way, and Cod-fish
Summon those very odd fish
The Sticklebacks who fight so well—tell each to bring his spear."

11.

"Shrimp-Guards collect your forces
And saddle our sea-horses,
Bid Gen. Sword-fish straightway mount and call the Lobsters out;
The Seal shall tarry by me,
The Crab-cadets watch nigh me.
In times like these I like to have my watch and sea about."

12.

'Twas done. With scales bright gleaming,
And sea-weed banners streaming,
With martial band, and sword and lance, they bravely sought the foe!
One in his boat was floating—
Soon ended was his boating;
The Octopus seized both his legs, and dragged him down below.

13.

On Turtle's back they bound him
And placed a guard around him,
Then hurried back to big Prince Whale the glorious news to tell.
He, by the by, had eaten
Since they had held their meetin'
Some thousand crabs, and shrimps, and fish; he *must* have loved them wel

14.

"Unbind the knave offishous—
This fisherman so vicious,"
Thundered the prince "from this day forth our pris'ner he shall be
Shut up within a cell, Sir,
Made of the strongest shell, Sir;
There shall you stay, and rue the day you braved us of the sea!"

15.

Alas! for such great blowing
The captain proved too knowing;
That very night he burst his shell, and gaily swam away,
But he returned with dozens
Of his brothers, friends, and cousins
And captive took Prince Whale himself, and all his court, next day!

16.

And now they're all a-plashing
A swimming and a-flashing
In giant tanks built just for them, and feeling quite at hum.
"Hum's wrong?" Yes, yes. I know so,
But it will have to go so,
For it must rhyme with my last word—in the Aquarium."

W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM. JOURNAL.

NEW YORK, OCTOBER 11, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for free distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of fifty cents, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to New York Aquarium, corner 35th Street & Broadway.

In our Salutation to the readers of THE AQUARIUM JOURNAL, we shall crave but a brief hearing while defining its proposed purpose and plan, directing them for information regarding the Aquarium itself to the letter of MR. COUP, and the descriptive articles which appear elsewhere in these columns.

THE AQUARIUM JOURNAL, though published by the Managers of the New York Aquarium and designed for general distribution, will be so conducted as to commend it to the favor of those directly interested in the study of Natural History. If in this, the initial number, extended space has been given to a history of the Aquarium, and a descriptive and illustrated account of its construction and purpose, let it not be understood that the JOURNAL is in any degree an advertising sheet or programme. In its columns will appear such original and, selected papers as relate to the history and habits of fish, together with such articles and communications as are of allied interest. Though, as its name indicates, the leading place will be devoted to the history, structure and habits of the numberless marine forms exhibited in the tanks of the aquarum, yet special attention will be given to general Natural History, Microscopy and kindred subjects.

It is also designed that the JOURNAL shall be a condensed Guide to the Aquarium itself. In order to accomplish this the last page will present a ground plan of the Aquarium, accompanied by an index to the tanks and their occupants.

Believing that our youth are already interested in Aquaria and anxious to learn more of what they teach, and more especially confident that parents will not neglect this opportunity of educating their children, we shall devote a given space in each issue to the little ones, and endeavor to so entertain and instruct them as to engage their lasting interest. It may be also pardonable to add, that since the AQUARIUM JOURNAL is a free gift to the public, it would aid in the work we design to accomplish were our readers to occasionally manifest their interest and appreciation by the contribution of such facts and fancies as may prove of value to the cause for which we labor.

In this age of special scientific inquiry with its accompanying flood of theories and conjectures, we are prompted to define our position by stating that while as exponents of Natural Science we shall endeavor to promote and extend the cause of demonstrable truth, we cannot fail to recognize the fact that man feels as well as reasons. Hence while acknowledging the supremacy of Natural Law this acknowledgment shall ever be accompanied by such reverence as is due to the one great Law-giver.

A LETTER FROM MR. COUP.

MR. EDITOR—DEAR SIR :

In answer to your request I am prompted to give to the public through the columns of our journal a brief history of the New York Aquarium and my efforts in connection with its establishment. As the originator of the scheme, the successful accomplishment of which is now recognized, I may be pardoned if in the following brief sketch I give prominence to my own personal efforts and services.

It was during a European tour made four years since, that my attention was first attracted and interest engaged by the number of great public aquaria there established, and so impressed was I with the value of these institutions as entertaining and instructive places of popular resort that I at once determined to secure the establishment of one in the American metropolis. Having thoroughly examined the several foreign Aquaria and consulted with those interested in their maintenance, I hastened my return to America, severed my connection entirely with all other enterprises, and at once began my endeavors to secure for the City of New York a grand fresh water and marine Aquarium. My first proposition was to construct one in the Central Park, defraying all the expense but claiming the privilege of retaining, for a given period, such profit as might be obtained from a small fee for admission ; but when compensated for the outlay, presenting the institution to the city as a gift. Although admitting the great value and need of such an institution, the gentlemen of the Park Commission were not able to accept this proposition, owing to certain legal restraints forbidding the use of public grounds under these conditions.

Having, however, become convinced of the importance of such an institution as an entertaining and instructive place of popular resort, I finally determined to undertake alone the great work, to the successful accomplishment of which your attention is now directed. The large plot of ground at the corner of Thirty-fifth Street and Broadway was selected as affording a central site, and upon it the erection of a suitable building was begun. At this time CHAS. REICHE & BRO., the celebrated importers of rare and valuable animals, became associated with me, and it is under our joint direction and proprietorship that the work has been completed. The services of PROF. H. D. BUTLER were also secured, who, in the position of Superintendent, brings to the aid of the enterprise a long and rare practical experience ; and it was also in the interest of this institution that MR. W. S. WARD made his recent European tour, the information gained by him having greatly aided in rendering the New York Aquarium as attractive in appearance and complete in arrangement as any in the world.

In addition to the services rendered by these gentlemen I have been so fortunate as to secure the active support and sympathy of PROF. BAIRD, of the United States Fish Commission, to whom I am indebted for valued advice and counsel, and who has kindly promised to aid me in the stocking and proper maintenance of the Aquarium. MR. FRED. MATHER, under whose direction the fish hatching tanks have been constructed, will also bring to this interesting and novel feature a long and valued experience, I will not dwell on an extended description of the Aquarium itself, since that is given elesewhere, and as it is now open to the public it will make its own appeal. It is due, however, to myself and to those associated with me, that some reference be made to the difficulties attendant upon the successful completion of so great an enterprise.

Although possessed of all the attainable data regarding the Aquariums of Europe. I was yet constantly embarassed by unforseen obstacles which only repeated experiment and the lavish expenditure of money could remove. Many of these obstacles were of a nature which occasioned discouraging delays. Being the first great American enterprise of this character, I was obliged to secure many of the needed materials and appliances in Europe. From this distant quarter all the heavy plate glass was obtained, and even the pumps are of European manufacture, and were specially ordered for this service. At this point I am compelled to admit, however, that had I not been wanting in both faith and knowledge I might have procured a far better and more serviceable pump nearer home. The piping also, which is all of hard rubber, was designed and manufactured here for this special service, as was also all the iron work, which was made from designs furnished by our architect, MR. A. B. OGDEN.

As there is presented elsewhere a detailed description of the building and interior apartments, I shall refer simply to the endeavors I have made to secure a full and varied representation of marine life. These endeavors were also attended by misfortunes and failures which, however, have at last been offset by equally marked successes. Two whales obtained at great expense from the coast of Newfoundland by the efforts of a special expedition, reached the Aquarium at a time when, owing to the delays above mentioned, there was no fitting receptacle prepared for them, and hence they soon died. The same expedition was, however, again dispatched to the northern coast and as the result of months of labor, has at last announced the capture of another of these sea monsters, which will soon be displayed in our grand central tank.

While these efforts were being made at the North, another expedition has been sent to the Southern Seas, and a vessel to the Pacific Coast, while other experienced collectors are busy nearer home, as it is designed to furnish a full exhibit of the many and interesting varieties which abound in our northern waters.

In closing, I take sincere pleasure in directing the attention of the public to a feature of the New York Aquarium which is specially designed to promote and encourage original scientific research and aid in the study of Natural History in all of its most important branches, This consists in the establishment of a Free Scientific Library and Reading Room, as an adjunct to the Aquarium, together with a Naturalist's Workshop, fitted out with all the needed modern appliances, including microscopes, experimental tanks, dissecting tables, &c. This department is under the immediate charge of MR. WARD, at whose suggestion it was established, and we propose to admit to the privileges of this scientific quarter any and all of those who, either as students or teachers, may desire to avail themselves of the advantages of study and research here afforded.

Trusting that I have not trespassed upon the patience of our readers, and in the hope that my earnest efforts in their behalf will be appreciated by the public, in whose interest they have been made, I remain,

Respectfully yours,

W. C. COUP,

Manager of the N. Y. Aquarium.

THE NEW YORK AQUARIUM.

In a letter from Mr. W. C. Coup which appears elsewhere, the writer, as General Manager of the New York Aquarium, gives to our readers and the public a brief history of the movement which has resulted in the establishment of this institution in our city Without again referring to the difficulties which have been overcome, and the numberless obstacles which have at last been successfully removed, we will enter at once upon the welcome task of guiding the visitor through the Aquarium and describing its novel and attractive features.

On approaching the building the novice in Aquarial matters might be prompted to question its architectural design, since the roof of the building appears too low in view of the extended area its walls inclose. Instead, however, of this being an architectural defect, it is in truth an essential feature, since the proper lighting of the tanks could only be accomplished by this form of construction.

On being admitted to the interior, the visitor, should it have been his good fortune to visit any one of the famous European Aquaria, will be at once engaged by the novel and attractive appearance of the main hall.

Standing upon an elevated platform he looks out upon a graceful pavilion, the roof of which is supported by columns of rustie work, most tastefully designed, while curtains of rustic tracery extend from column to column, the lower edges forming arches beneath and beyond which appear the fronts of the great marine and fresh water tanks. A rustic bridge in the distance affords a rare ontlook from which a complete survey of the pavilion may be made. Below this bridge and extending beyond it to the southern limit is a beautiful pool enclosed in heavy rock work. This is to be the home of the sea lions, while in front of the bridge and occupying the central space is a circular tank thirty feet in diameter and composed of great panes of the clearest plate glass, the crystal curves being only interrupted by the needed iron work frames. In this tank will be found the whales, or in their absence other great fish equally interesting and attractive. Descending from the bridge and entering upon our round of observation we shall first be attracted by a low wall of masonry which is found to enclose a second pool of crystal water, in which, now swimming in graceful curves below the surface, and now basking their odd shapes in a sloping platform designed for their special use, are the seals, the most intelligent and fascinating of all the inhabitants of this water world of ours. Having now examined these three isolated features we start on our tour of observation beneath and behind the ivy grown and rustic arches. Pushing aside the drapery which is needed to shield the tanks and their occupants from all direct light, we move down a long coridor flanked on one side by the rustic walls and hanging drapery and on the other by a wall of water. The first tank encountered as we enter from the south is that designed to contain the sharks. This is sixty-five feet in length and as we stand in front and view the hideous forms and yet graceful movements of the imprisoned monsters, it is as though we were walking through a channel in the sea. As the glass which composes the fronts of this and all the other tanks is an inch or more in thickness there is no occasion of dread, although its purity and clearness leaves the observer in doubt as to whether the water itself is not within reach. The light which illumines these tanks is all admitted through skylights from above and at night by an continuous series of gas jets. Passing along this extended front we come to an angle which opens out to the left a still more extended vista. Here is another wall of crystal one hundred and fifty feet in length, which is divided into rock lined caverns, each division contain such fish and sea forms as can be trusted in each other's company. The beautiful angel fish and all his brilliant finned companions from tropical seas; the salmon, blue fish and skate, the venomous sting ray and the robber crab, while here in a secluded nook is a veritable water garden with its blossoms of anemonies. Along the pebbled bottoms, lobsters and turtles stride and creep, and above all come down, as if from the clouds, jets of crystal air bubbles. We have now reached the lower limit of this sea walk and an attendant admits us by a narrow doorway to a place behind the scenes. It is here, after all, that the greatest wonders are to be found, since from this point alone can we be led to comprehend the true nature of the great work here accomplished. Heavy brick walls enclose the reservoirs, into the front of which we have been gazing. Peering over the edges of these we see the fish sporting below while crystal jets of water flow from an extended line of pipes, and beneath the gas jets, if it be night, give forth a weird reflection from the surface of the water below. It is here also that we discover that the crystal wall we have seen fronts a series of tanks, so constructed that from the center to the opposite ends an incline is made which secures an active circulation of the water. At a future time we shall undertake a special description of the construction of the tanks and demonstrate the value of the system here adopted.

Let us now return to the main hall and descend to the engine and pump rooms, which region is the heart of this beautiful sea wonder. Here we find shut out from sight a great sunken reservoir filled with the purest sea water obtained from a point beyond Sandy Hook and conveyed to its present receptacle, but by the aid of a vessel and then by great movable tanks. This water is drawn from the reservoir by means of pumps composed solely of vulcanite or hard rubber, which substance is chosen as the only one which may be brought in contact with salt sea water without contaminating it For the same reason all the pipes for the delivery of the hundreds of crystal streams we have already seen, is of the same material, and it is estimated that in this single building there are now in position nearly four miles of rubber and iron piping.

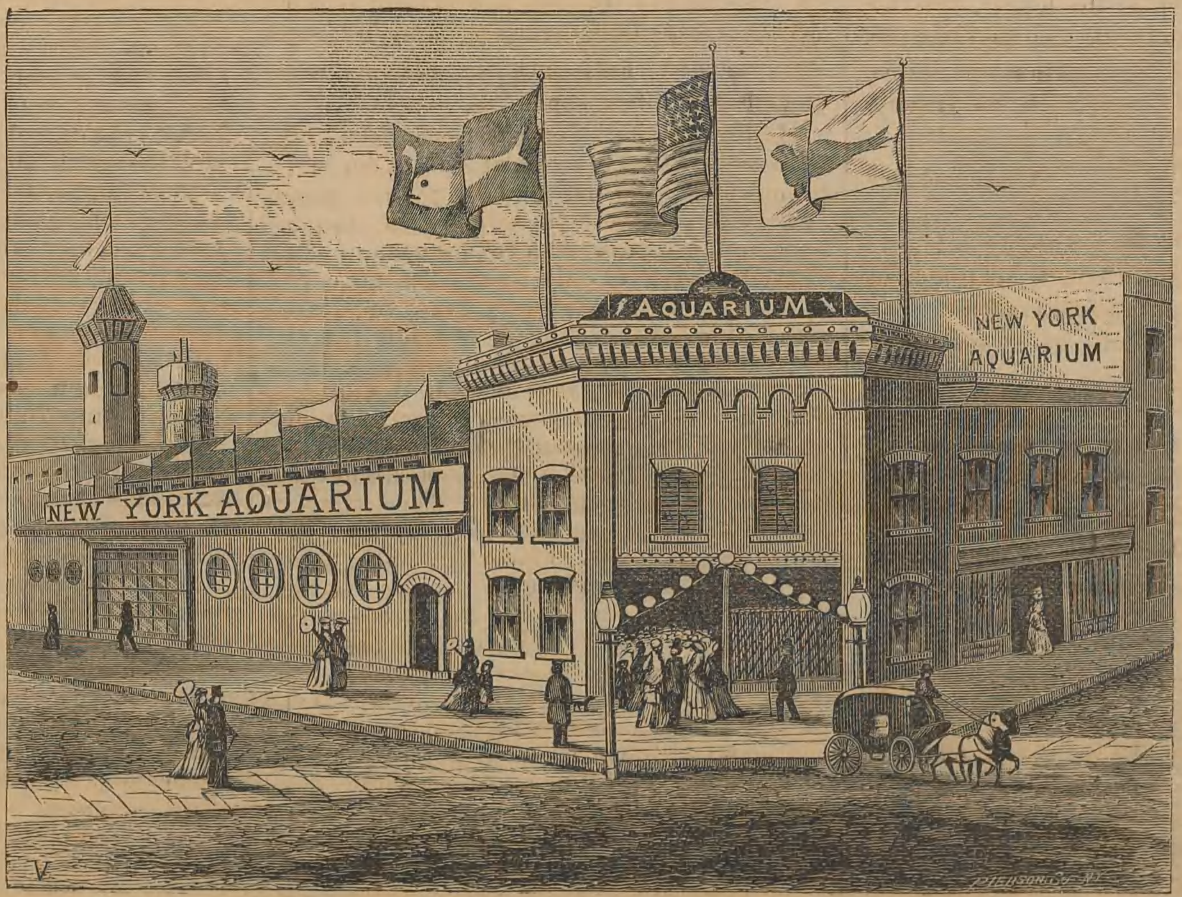
As we return to the pavilion above we pass another glass-walled reservoir, in which the fresh water, designed for lake and river fish, is allowed to settle and become pure and crystaline before it is started on its circuit through the tanks.

Being again in the pavilion we are attracted by a beautiful array of smaller tanks, which stand on tables, and are so arranged as to admit of a careful survey and study of the forms and habits of the occupants.

Should the visitor be now weary with his wanderings he can rest in the main pavilion, or turn aside into the gentleman's reception room, and while indulging in a quiet segar review and make a record of his observations. If, however, the guest is prompted by what he has seen to avail himself of special privileges to become a student of nature, as well as an observer, the library and laboratory are at his service, restricted only by the assurance that he is engaged in a work of legitimate scientific research. In this effort he will also be aided by an examination of the process of fish hatching and culture, for which full provision has been made in the main hall.

An agreeable duty would be omitted were not the writer's attention especially directed to the strictly artistic appointments of the Aquarium. In addition to the marked effort which has successfully been made to secure to the main pavilion all that art could do to introduced with the intent to gratify the eye render it attractive special features have been and ear of the connoisseur. The series of statues which break the front of the columns have been carefully selected and artistically arranged, while the music will be furnished by one of our leading musical conductors, Mr. Dodworth.

This much for the New York Aquarium as it appears to the visitor during a hasty survey. What it will be when he has leisure to study its vast resources in detail, may be readily comprehended, now that the way has been opened and the paths marked out.



NEW YORK AQUARIUM, Corner 35th Street & Broadway.

BUTTERFLIES OF THE SEA.

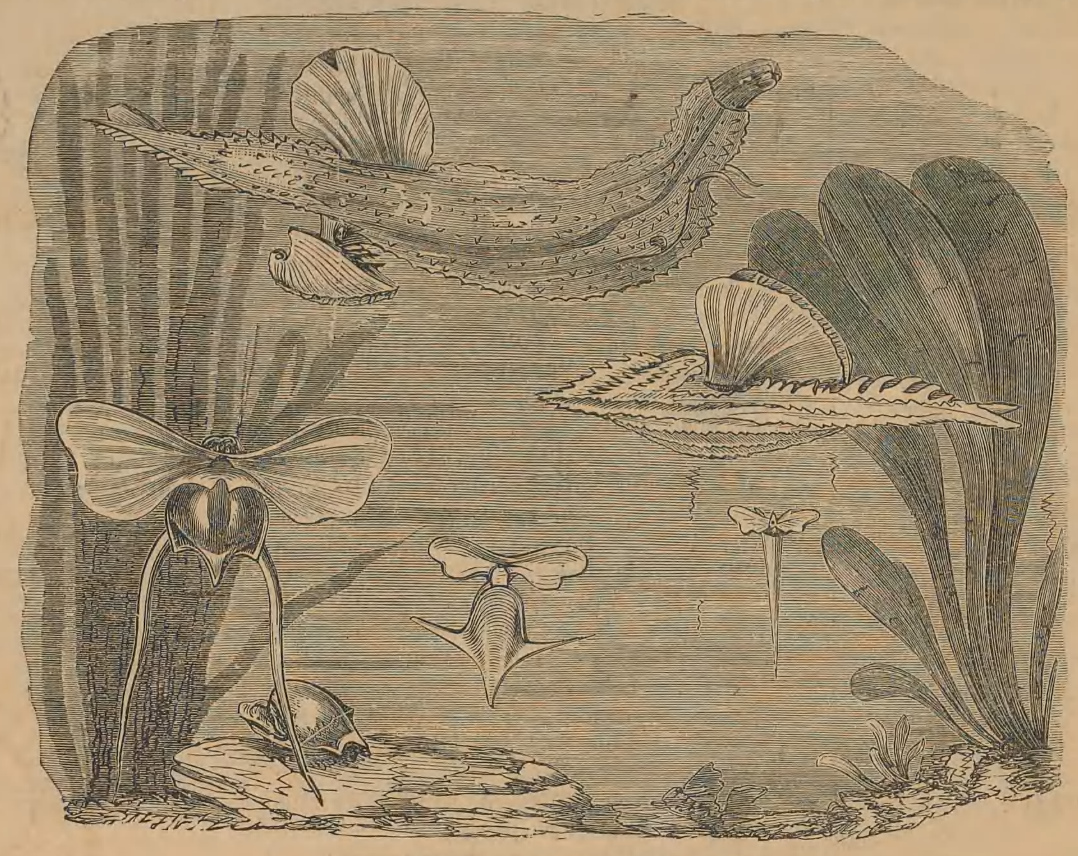
Although it is intended that the New York Aquarium shall be the most complete in the world as respects the beauty, rarity and variety of the forms of marine life there exhibited, yet there will still remain many wonders of the great sea which it will be impossible to capture and confine. This being the case it is the purpose of the conductors of this journal to resort to illustrated descriptions where the actual living object is not to be obtained. With this object in view and as the first of a series of kindred articles, the attention of our readers is directed to a small but important group of mulluscs bearing the technical name Pteropoda or, wing-footed molluscs, but to which the more popular term of Butterflies of the Sea has also been given.

A recent writer gives us the following interesting description of these strange creatures, and this account is rendered the more attractive by the carefully chosen illustration which we have added. We are told that away in the far north of the Arctic regions, floating in myriads upon the surface of the northern seas, and constituting vast fields of life, through which ships may sail for days and nights together, are found multitudes of small animals, to which the appropriate name of "butterflies of the sea" has been given. To watch one of these beings, persuing its way through the waters by means of two wing-like appendages springing from the sides of the neck, and to note the delicate body, inclosed in some cases in a delicate glassy shell, the comparison or resemblance to the ærial insect is by no means far-fetched or strained. And in their organization and habits, these little organisms may be found to present some points of great interest to the non-technical reader; whilst to the naturalist they have ever afforded subjects of pleasant study and instruction.

The position of the sea-butterflies in the animal scale is of sufficiently well-determined kind. They are molluscous animals, that is, are allied to our ordinary shell-fish, such as oysters, mussels, &c., as well as to cuttle-fishes and allied beings. Their nearest relations are undoubtedly the whelks, cowries, and other shell-fish, belonging to the great molluscan class known to naturalists as the *Gasteropoda*; and whilst some naturalists regard the sea-butterflies as forming a distinct group of themselves, others, and with every show of reason, maintain that they should be placed merely as a branch of the Gasteropod class. The scientific appellation of our sea-butterflies is the *Pteropoda*—a name signifying "wing-footed," and which is thus of expressive enough kind, when we consider the manner in which they flit over the watery wastes.

Besides being able to swim quickly and well by aid of their wing-like fins, the sea-butterflies can descend into the ocean-depths, or ascend from these depths to the surface, at will. They appear further to come to the surface chiefly at night or in the twilight; and as a naturalist has well remarked, each species or kind of these animals seems to have its own and special degree of darkness in which it ascends from the depths. Thus, did we know sufficient of the history of these little animals, we might be able to construct a Pteropod-clock by watching the respective hours of their appearance at the surface of the sea; just as the botanist forms a 'floral clock' by watching the times of the opening and closing of flowers.

Being 'shell-fish,' the Pteropods usually possess a shell; this latter structure, it must however be noted, not being developed in all these beings. A very beautiful, and at the same time most representative kind of sea-butterfly, is that known by the name of the *Hyalæa*, of which kind there are several distinct species; and in this form, as well as in another well-known species called *Cleodora*, a shell is developed, The shell is thus seen to consist of a very delicate glassy structure, somewhat triangular in shape, and of elongated form in Cleodora; that of Hyalæa being composed of two plates united together, and forming a small shell of elongated or globular shape. The little head extremity of the animal, provided with its 'wings,' protrudes in each case from the front or open extremity of the shell. Another very familiar sea-butterfly is the *Clio*, which does not possess a shell, but appears as a little oblong body about an inch in length, and terminating in a lower pointed extremity.



CARINARIA. *Carinaria Mediterranea.*
HYALEA.—*Hyalæa tridentata.* (Empty shell below.) CYMBULIA.—*Cymbulia Peronii.*
CLEODORA.—*Cleodora pyramidata,* SPIKE-SHELL.—*Creseis aciculata.*

No part of the structure of the sea butterflies presents more surprising details than that of the head and its appendages; the latter consisting of tentacles, jaws, and like apparatus, exercising the sense of touch and other offices. Thus, on each side of the mouth of Clio, we discover three fleshy appendages, which at first sight might appear to consist of simple tentacles or organs of touch. When, however, we bring the microscope to bear upon these bodies, we note the interesting fact, that the surface of each is literally studded over with numerous minute specks, which, when more fully magnified, are seen to be of hollow cylindrical shape, and to contain, each about twenty little suckers. These suckers may be protruded at will from their respective cylinders, so as to constitute an efficient apparatus for seizing and detaining particles of food. Thus if we consider that each of the six tenacles bears, on an average, about three thousand of the cylindrical bodies, and that each of the latter in turn contains about twenty suckers, we reach the enormous number of three hundred and sixty thousand suckers, as constituting the prehensile armament of a single Clio, itself of very small size. And imagination may assist us in its scientific aspects better than any other intellectual process, in endeavoring to form some idea of the extreme delicacy of the muscles and structures whereby the protrusion and retraction of the suckers are secured.

Two fleshy 'hoods' serve to inclose the tentacles when the latter are not in use and are retracted; and other filaments exist which may be used to subserve the sense of touch in these forms. Within the little mouth of the sea-butterflies, as also well exemplified in Clio, peculiar jaws and a curious 'tongue' exist, for the mastication of food. Each jaw is a conical structure, which literally bristles with sharp spiny teeth; and the 'tongue' is likewise studded over with recurved hooks, which also aid in rasping down or triturating the nutrient matters. And as completing the alimentary apparatus of the sea-butterflies, we find a well-developed throat, stomach, a large liver, salivary glands, and other addenda; whilst a heart is also present, along with a system of blood-vessels for the conveyance of the vital fluid through the body. The breathing organs in some of these beings are well developed, and appear in the form of delicate gills, or analogous structures, which are sometimes, as in Hyalæa, inclosed within a special chamber, but in others, such as Clio, are apparently unprotected, and of indistinct nature.

A very large 'brain'—or at anyrate a mass of nervous matter corresponding in function to the great nerve-centre of higher animals—is developed in the sea-butterflies, and can be discerned lying beneath the throat, and forming, in fact, a kind of internal collar around the gullet. And nerves accordingly radiate throughout the body from this central mass, and supply the various parts of the organism with feeling and vital power. Especially, as we might expect, do we find the delicate tentacles of the head to receive a large nerve-supply; and we may also note the presence of two eyes, situated on the back of the neck. These latter organs are not of a very high order of development, but doubtless subserve the function of guiding their possessors in their marine flights.

The food of our sea-butterflies appears to consist of the more minute marine Crustacea, which with themselves, haunt the surface of the sea. Thus these small beings exist on organisms of still lesser magnitude. But in turn the sea-butterflies form a large proportion of the food of the largest of animals—the whales themselves. Drawn in myriads into the capacious mouth of the Greenland whale, with the floods of water which the great monster of the deep from time to time imbibes, the sea-butterflies remain entangled in the 'baleen' or whalebone plates of the jaws, and are thereafter swallowed as nutriment; and the species *Clio Borealis*, from this latter circumstance, becomes known to us under the popular name of 'whales' food.' Sea-birds also prey upon the butterflies of the ocean, which thus contribute largely to the support of much higher forms than themselves. In the Mediterranean Sea, on the Australian coasts, and in the Atlantic Ocean, the sea-butterflies also occur, but not in such numbers as in the far north, whither, to the very home of the Pteropods, modern enterprise has advanced on a noble mission of discovery.

Small as are all the existing representatives of the sea-butterflies, it may prove interesting to note in the last place, that, in past epochs of this world's history, several relatively gigantic members of this class appear to have been developed. In some of the oldest (Silurian) rocks, large shells of Pteropoda are discovered as fossils; one extinct species, known as *Conularia*, attaining a length of about a foot, and a breadth of fully an inch—dimensions these, of giant kind, as compared with the shells of living sea-butterflies. And in more recent rocks, the small delicate shells of our living Cleodoræ and Hyalæa may be found in a fossil state; proving thus to us the ancient ancestry of the existing 'butterflies of the sea.'

To these varieties above described may be added several others, a group of which is shown in the illustration; the arrangement of the names in the title is so made as to indicate the objects to which they apply. At the extreme left we have the Hyalea, described above, and on its right the Cleodora, of which Mr. F. D. Bennett writes as follows: "On that part of the body which is lodged in the apex of the shell, there is a small globular pellucid body resembling a vesicle and which at night emits a luminous gleam sufficiently vivid to be visible even when it is exposed to the strong light of a lamp. It is the only example of a luminous shell-fish I have ever met with, nor would the luminosity of this species be of any avail did not the shell possess a structure so vitreous and transparent." There will be no difficulty in recognizing the little spike-shell, in the right hand corner, whiledirectly above it is the beautiful Cymbulia, whose shell has been likened in shape and translucency to the glass slipper of fairy mythology. Above all, as though keeping watch and ward over its smaller comrades, is the Carinaria, the largest and most formidable of this grotesque and interesting family of Neptune.

BIRDS AND ANIMALS.

Among the various objects of commercial gain that have given birth to wide and daring enterprise may be appropriately mentioned bird gathering and wild animal hunting—particularly the latter. The privations and perils encountered in these pursuits are many and multiform, and of a nature not easily understood, except by those actually engaged with expeditions equipped and designed to penetrate the dangerous abodes of the monsters and monarchs of the forest. But it is not of the hardships and risks of the business that we desire particularly to speak, but rather of the astonishing growth of an industry which is of comparatively recent birth—an industry of to-day.

Previous to the year 1847 the trade of collecting and disposing of rare specimens of the feathered tribe was almost unthought of, and the same may be said of the capture and sale of the ferocious beasts which roam the earth with freedom and unrestraint. About the year named, however, two adventurous and ambitious spirits conceived and carried into practice the idea of inaugurating a traffic in the delicate and beautiful little birds that abound principally in the neighborhood of the celebrated Hartz mountains, near Turin, and at once put the experiment to a test. They were successful from the first, though on a small scale, and by perseverance and industry laid the foundation for what eventually developed into a most lucrative business. This was what brought into existence the present well-known firm of Chas. Reiche & Bro., whose little store at No. 55 Chatham street, this city, is almost as well known as the New Post Office to the inhabitants of New York.

The United States at first seemed to offer but an indifferent market for the sale of rare birds, but as taste and culture grew so did the demand for the beautiful increase, until from an annual importation of 2,500 the number of birds now yearly brought here figure up 100,000, while thousands are sent direct from Europe to Melbourne, Valparaiso, Rio Janeiro, Cape Town, and various other marts. As for this country, not a city of over 25,000 inhabitants but has its Bird Store, where formerly there was but one—that of the Reiche Bros., in Chatham street. The rapid increase of this business here evidences, perhaps, better than anything else, the marvelous growth of American taste and refinement, and again the wonderful results of individual enterprise, for the Messrs. Reiche to-day enjoy a monopoly of the business they invented as thorough as though the possibility of rivalry was effectually disposed of, as it is. They began their career, of course, on a narrow scale, but they brought to the task a persevering steadiness, rigid economy and strict integrity. To these were added an aspiring spirit that always looked upward, a genius bold, fertile and expansive, a sagacity quick to grasp and convert every circumstance to its advantage, and a singular and never wavering confidence of signal success. As their means increased the brothers made annual visits to the Hartz Mountains, where they secured those birds that could not be obtained elsewhere. These they brought to New York. Their capital and resources had by this time greatly augmented, but their genius had ever been in advance of their circumstances, prompting them to new and wide fields of enterprise beyond the scope of ordinary merchants.

The idea next presented itself to the brothers of establishing agencies in and equipping expeditions into various countries, for supplying animals to the Zoological Gardens of Europe and America. For some time they revolved the scheme in their minds, gradually extending and maturing their plans as their means of executing them increased. It is due to them to say that they were not actuated by mere motives of individual profit. They were already wealthy beyond the ordinary desires of men, but they now aspired to that honorable fame which is awarded to men of determined purpose. The new venture was successful in every respect, and it is a well-known fact that all the animals that are to be viewed in the famed resorts across the Atlantic, as well as those here, have passed through the hands of the Messrs. Reiche. Mr. Chas. Reiche has for years advocated the establishing in his adopted city of a Zoological collection as extensive as any in Europe; an institution that would be for the benefit, amusement and instruction of the whole people. But although he has offered extraordinary inducements toward the furtherance of such a project, he has thus far met with little or no encouragement, and until such time as we realize the importance of placing our public attractions on a scale commensurate with our opulence and prominence we may despair of having an ornament of this kind.

INDIAN SUMMER.

A recent writer in *Scribner's Monthly* discourses of our American Indian Summer in the following charming fashion:

"This halcyon period of our Autumn will always in some way be associated with the Indian. It is red and yellow and dusky like him The smoke of his camp-fire seems again in the air. The memory of him pervades the woods. His plumes and moccasins and blanket of skins form just the costume the season demands. It was doubtless his chosen period. The gods smiled upon him then if ever. The time of the chase, the season of the buck and the doe, and of the ripening of all forest fruits; the time when all men are incipient hunters, when the first frosts have given pungency to the air, when to be abroad on the hills or in the woods is a delight that both old and young feel; if the red aborigine ever had his Summer of fullness and contentment, it must have been at this season, and it fitly bears his name."

THE
New York Aquarium,
Cor. 35th Street & Broadway, N. Y. City.

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ATTRACTIVE EXHIBTION
OF RARE. BEAUTIFUL AND CURIOUS
SEA WONDERS
GREAT AND SMALL.

IMPRISONED IN IMMENSE
FRESH WATER AND MARINE TANKS.

THE MOST COMPLETE AND
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GROUND PLAN
OF THE
NEW YORK AQUARIUM.

The direct and immediate purpose of occupying this page of the Journal with a permanent illustration of the ground plan of the main pavilion, was to accompany it with an index or guide to the many interesting objects contained in the tanks here shown. By this means it is designed that visitors shall have directly at hand a convenient directory and guide.

In this, our initial effort, however, we may be pardoned a postponement of the principal features—that of a classified index—while we direct the visitor's attention to the size, location, and purpose of the tanks and their adjuncts. The time chosen for the general survey is the more propitious in view of the fact that fish, like their masters, are to a degree creatures of climate. Hence a guide that might direct the visitors to their present home might fail to be of permanent value In a word the complete classification and arrangement of the fish has not yet been accomplished, though they are all here, and possibly some zest may be added to the visitor's efforts if he is compelled to find them himself.

Thus much for what may be taken for an apology—if one be indeed needed—for a seeming but intentional neglect; and now the visitor,, who has already been informed as to the general features of the Aquarium, will follow us in a detailed description of the size, location, and purpose of the several tanks and ponds.

Entering at the point indicated we pass along a platform slightly raised above the line of the main floor of the pavilion. Beneath this floor, and others adjacent to it, are the boiler, engine and pump rooms, together with the grand fresh water and marine reservoirs. And if the visitor be an enthusiast, as becomes all students of Nature, a visit to these subterranean regions would be as full of delight as would a disclosure of the living working heart be to the anatomist or surgeon. Having advanced upon this entrance platform till the main floor is reached, an inspection of the tanks in their alphabetical arrangement is in order, and to this methodical inspection will the remaining time and space be given.

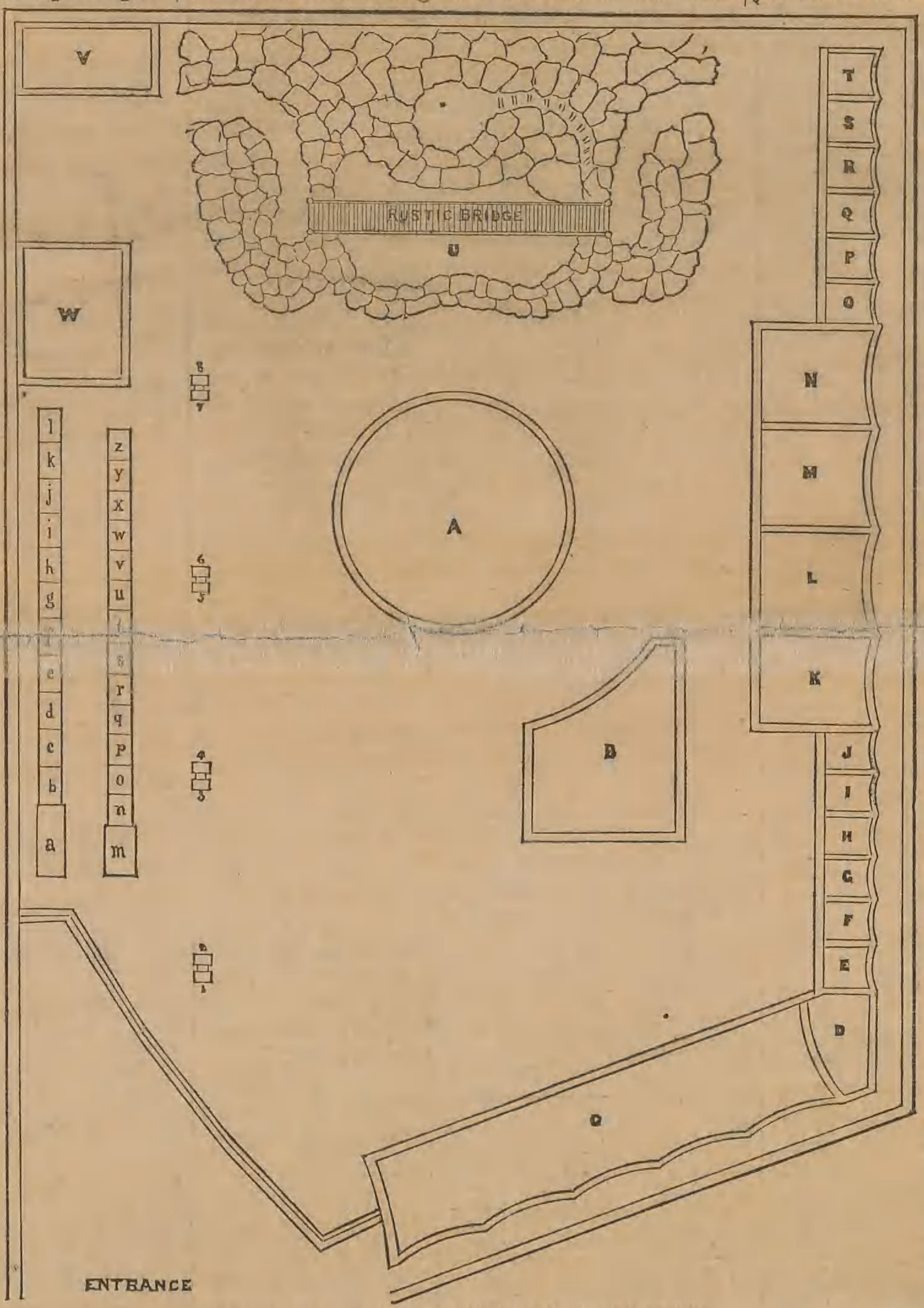
In the centre of the Hall is the grand circular whale tank, A, having a diameter of thirty feet, and an even height of eight feet. The lower wall or base of this tank is solid masonry lain in Portland cement, as the absence of all lime is essential to the life of the inmates. Above this wall and sustained by a graceful iron frame work is the circular glass front, composed of heavy plates of the purest glass, each plate being over four feet high and three wide. It is designed that this tank shall be the home of the whales and other great fish, and hence the water level is exposed that the visitor may witness the interesting process of blowing or spouting.

Occupying an irregular space of equal area with that of the whale tank, is the seal pond, B, which is surrounded by a low wall of masonry, but free from glass, as the movements of these interesting creatures are best observed from above. Returning to the line of the front platform, we begin our tour in front of the continuous series of wall tanks, so named as the exposed surface presents the appearance of a glass wall, unobstructed save by the needed iron frame work. The first of these tanks C has a front of sixty-five feet, a length exceeded but in one case by any Aquarium in the world. Here will be confined the shark, porpoise, sturgeon, and other of the larger forms of marine life. Passing on to angle marked by the concealed store tank D we reach the upper end of a continuous line of tanks similar in construction to C but varying in size; the first three, as well as the distant ones R, S, V, are fronted by single plates four feet in width and five in height The tanks of this series are lined with rock-work, and the three mentioned will be devoted to the use—or if we may use the term—the cultivation of the numerous class to which the sea-anemonies belong, and when fully stocked will rival if not excel in interest their more pretentious neighbors.

The net three tanks, H, I, J, are larger in size, and together with the still wider tank K will be devoted to the larger fresh water fish. This tank, K, together with the remaining three in the centre, L, M, N, are each ten feet in width and eight feet high; they are also lined with rock-work. Beyond the central four are the six remaining wall tanks which in plan and dimensions follow the order of the first six. These however, together with the tanks L, M, N, will be filled with sea water and devoted to the more rare and attractive forms of marine life.

Turning to the left, after reaching the lower end of this corridor, we approach a rockery and pool designed as the home of the sea lions. This abuts against the western wall and is spanned near the front by a graceful rustic bridge from which a full view of the floor and side tanks may be obtained. Descending from this bridge by its southern approach we face the trout tank V, and in front of it the trout hatching troughs W. Extending from these troughs to the entrance platform in two lines are the large and small table tanks, twenty-five in number, and indicated by the small letters in the alphabet, and attached to the side posts are other small tanks. Having now determined the location of the several tanks, the writer is prepared for an examination of their contents.

The descriptive article on the fifth page will indicate the mechanical and art features of the Aquarium, but only a minute and attentive examination of all its parts will render one familiar with their number and the complicate structure of the whole building, in the construction of which the best talent, scientific, mechanical, and artistic has been employed.



GROUND PLAN OF THE NEW YORK AQUARIUM.

The official direction and management of the Aquarium may be indicated as follows:

W. C. COUP,............................Manager.
PROF. H. D. BUTLER...............Gen'l Sup't.
MR. W. S. WARD.....................Naturalist.
And Director of Educational Department.
MR. FRED. MATHER.......Sup't of Fish Culture.
MR. A. W. ROBERTS......In charge of Fisheries.
F. T. VANCE.....................Illustrative Artist.

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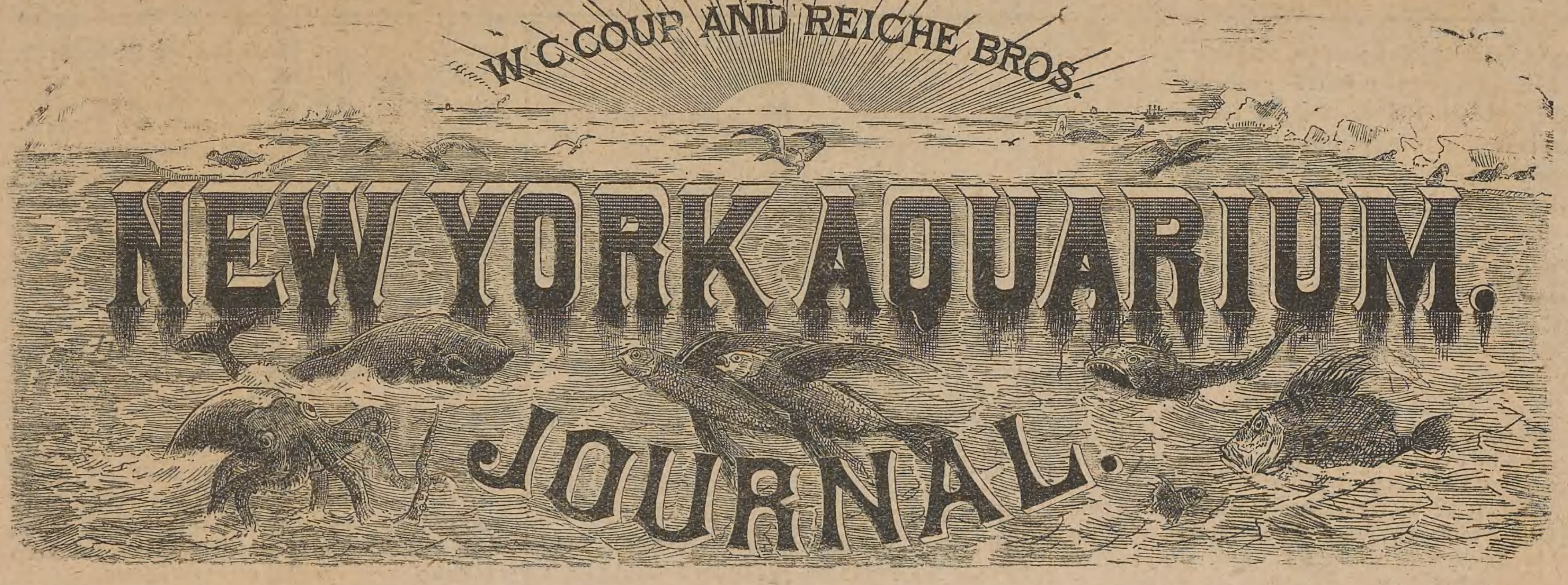

W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM. JOURNAL.

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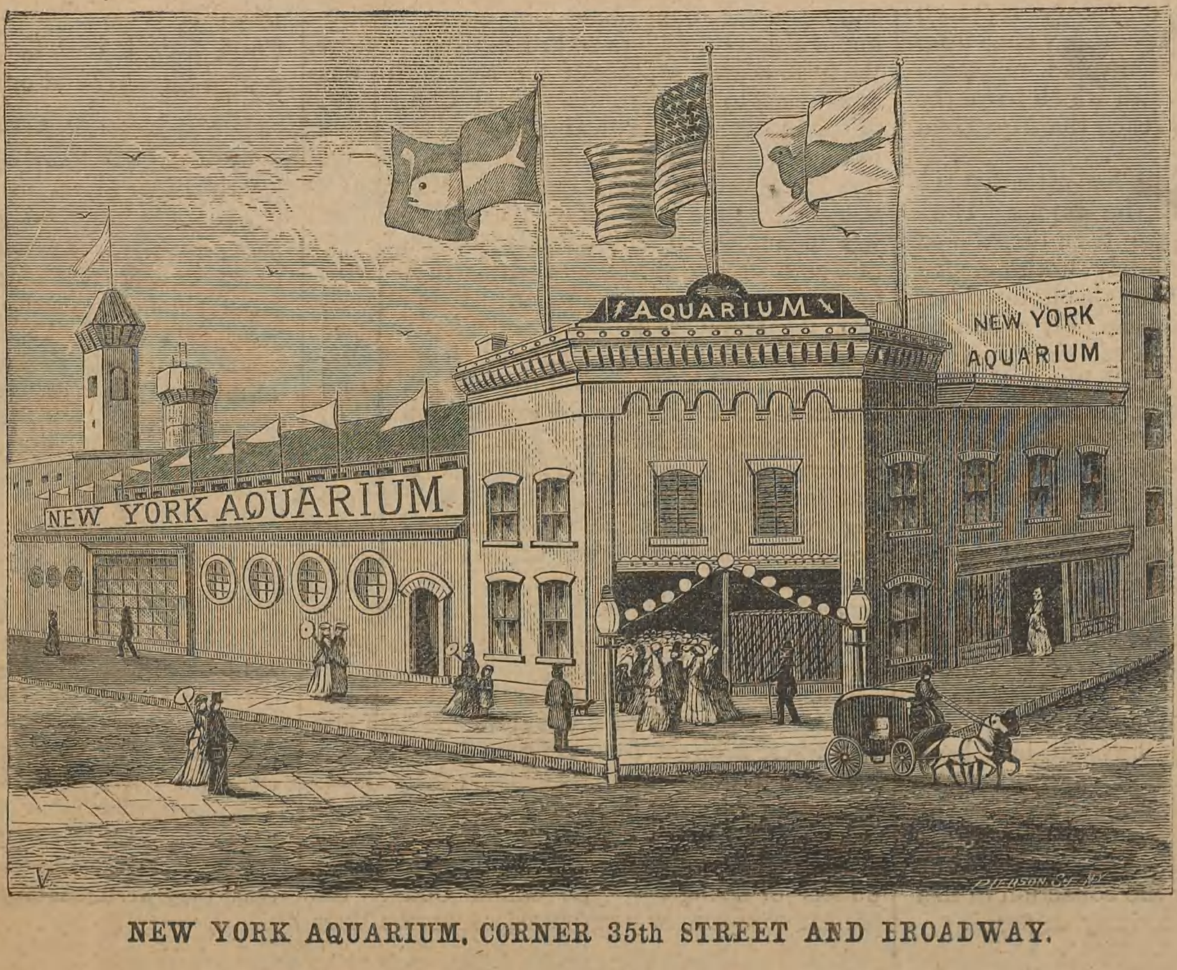
THE NEW YORK AQUARIUM.

Now that the New York Aquarium is an established fact, and its success assured, the Manager, Mr. W. C. Coup, has consented to make public many interesting details respecting the methods employed by him in the accomplishment of his design. If the value of a work is in any degree commensurate with the difficulties that have attended its completion, certainly the New York Aquarium deserves to rank among the most worthy and commendable of modern enterprises, and as the public have the advantage of the success there seems to be a measure of justice in presenting such facts as may heighten their appreciation and approval of it.

In the first place let it be remembered that Aquaria are novel institutions in America. It is true that others have occasionally furnished means for the entertainment of the public by the aid of small aquarium tanks, but so meagre were all these efforts compared with the project now completed, that no just comparison could possibly be made, and hence no previous local experience could be rendered of service. Therefore the Aquarium in America, being virtually a new project, must be to a degree an experiment; such, indeed, it is, and yet it is the testimony of those who know, that the New York Aquarium rivals in completeness and beauty any of the Old World.



NEW YORK AQUARIUM, CORNER 35th STREET AND BROADWAY.

In reviewing the work it is well to first consider the difficulties which attended the designing and construction of the building and its contents. The site chosen, though eminently fitted for the purpose as regards area and location, was yet not wholly favorable, as the wall must needs enclose a space irregular in form. So well has the architect adapted his means to the desired end, however, that the interior of the main pavilion is even more graceful in appearance than one having a more regular outline. The first grand difficulty was encountered when the construction of the tanks was undertaken. The beds of these great wall tanks are solid masses of masonry beneath their whole surface, while the dividing walls are of extra thickness, in order that they may withstand the extreme pressure to which they are submitted. For a like reason the fronts are of plate glass an inch in thickness, firmly laid. It was only after repeated trials and the loss of many of these splendid glass plates that a plan was devised for securing them safely and firmly in position. As these plates could only be obtained from England, and as any loss had to be renewed from this distant quarter, the reader may comprehend what a cause of anxiety and perplexing delay these failures occasioned.

Then came the still more perplexing problem connected with the storing and distribution of the sea water. In order to keep this water pure it must be stored away from the light in an immense cement-lined reservoir while the pumps and distributing pipes must be all of hard rubber. As no such pumps could be procured in this country, another foreign order was dispatched, and the delay in its fulfillment, and the imperfections of the work when finally received were such as to discourage any less determined and experienced a manager. If these delays and expensive trials were great, they were little as compared with the obtaining of a proper supply of sea water. It was at once evident that the only water that would serve the purpose must be obtained well out to sea; hence a steamer has been, and will still continue to be, constantly and solely engaged in bringing in sea water from beyond Sandy Hook.—This steamer is fitted

DSI

out with special pumps, storage tanks, &c., and yet when obtained the water can only be brought on the steamer to the dock ; from thence it is conveyed to the Aquarium reservoir in portable tanks. At this point it may be stated that in spite of all these precautions the sea water has yet to be filtered and ærated before it becomes perfectly clear. Lest an inexperienced visitor might murmur at the lack of perfect clearness in this water, we would state that no less an authority than Mr. Lloyd, in his correspondence with Mr. Coup, has demonstrated that this lack of clearness at first is a necessary evil which will soon be overcome by means of the system of æration now actively going on.

When it is remembered that the whale tank alone requires a boat load of water a day, some idea can be formed of the expense and difficulties attending this single effort.

Then there was the fresh water. As this was drawn direct from Croton mains, and as New York claims to have the purest water in the world, our readers may be surprised to learn that only after repeated filterings and purifications can this fresh water be made clear enough to display the contents of the tanks. Having now reviewed the Aquarium itself there remains to direct attention to the fish supply, and few of our readers are aware of the expense, delays, and discouraging failures which have attended the obtaining of the thousands of strange and beautiful fish which now are on exhibition in the Aquarium tanks.

As the whale is the "biggest fish" we would direct attention of the visitors to its capture, as recorded elsewhere. It may be added, however, that the summer just passed was the first for many years in which one of these monsters has been captured alive. The two that died early in the summer, after having reached the Aquarium, occasioned a pecuniary loss that would astonish those less familiar with the hazardous nature of this service, and as has been intimated, the one which is now on exhibition, requires a water supply so constant, that a steamer is continually engaged in meeting it. In the fresh water tanks are many interesting specimens of lake fish, but these too were obtained only after repeated failures. Three special expeditions have been engaged in this service alone, and not more than ten per cent. of the fish which leave the Western lakes and rivers reach the Aquarium alive.

An even less happy fate has attended the efforts to bring fish from the tropics. Here also four expeditions have been dispatched and returned with absolutely nothing. In the first instance a storm encountered off Sandy Hook, killed all these fish, a second party lost their full cargo on crossing the Gulf stream, and the third and fourth having landed safely at the New York dock, yet failed to bring their rare treasure to the Aquarium. Another expedition to Wood's Hole, Mass., started homeward after a month of hard labor with a rare and rich cargo, but again a storm deluged the vessel, and not one of all the lot reached its city home in safety. Again an expedition has for a long time been out on the Pacific Ocean, and it is hoped that their efforts will result in the capture of Walrusses and a Sea Elephant. We would hesitate to announce these discouraging failures were it not that repeated trials have at last been crowned with success. In conclusion let it be remembered that, of all animals, fish are the most delicate and sensitive to change, hence there is no end to these efforts, and all the present organizations for the collection of fish must be kept up and be actively engaged.

THE WHITE WHALE.

HOW HE WAS BROUGHT TO THE CITY, PLACED IN HIS FUTURE HOME AND PROPERLY CHRISTENED.

Almost before it was fairly light on Thursday morning, Oct 10th, a crowd had gathered in front of the Aquarium at Thirty-fifth street and Broadway, waiting for the coming of the whale. The matutinal milkman, the early laborer going to his work, the cartman, newsboys and the all-night denizens of the streets had joined the gang of workmen regularly employed in the building. and, anxiously looking for the arrival of his whaleship, Manager Coup and Prof. Butler stood at the door of the establishment. They had been up through all the long watches of the night, for it was not known at just what hour the train bearing this curious freight would reach the city.

It was about 5 o'clock that the heavy rumbling of some large vehicle was heard, and a shout of "There she blows" from the crowd without gave token that the patient waiting and anxious expectation of the last four days was at an end. The monarch of the deep made his entry into the metropolis, boxed closely up, like the most ordinary of fish. The sight of the huge wooden structure slung on a double set of mason's wheels was followed by a series of comments from the crowd outside far from complimentary to the inmate or to the management of the Aquarium, it having evidently been expected that after arriving in the city by the way of Newton's Channel he would have been drawn in triumph through the streets to the music of a full brass band.

With but little delay the wooden inclosure was transferred from the truck to the interior of the Aquarium, and the doors were closed on the crowd that thronged around the entrance. The perforated lid was removed, and there lay his marine majesty in admirable condition, and apparently perfectly aware that the quieter he kept the better it was for him. The box was rolled up to the huge tank which is to be his future home, and bands were passed around the body at various points. These were joined together and made fast to the hoisting apparatus, consisting of a series of pulleys and ropes dangling from the huge centre support of the roof. All was announced to be in readiness, and with a slow, steady movement, the great inert mass was raised in the air. By an ingenious arrangement the hoisting apparatus was shipped forward until it was just over the centre of the tank. The whale was then lowered, and advantage taken of his dormant state to slip the bands as soon as he touched the surface of the water. A shout arose from the employes as soon as the fact was successfully accomplished, and an enthusiastic Canadian who had accompanied the stranger on his travels baptised him with the exclamation : "By gar ! he sall be called 'Le Grand Coup !'" For a moment he lay quiet, and then began a "smelling investigation" of his new home. After nosing around a little while he seemed to come to the conclusion that all was well, and devoured with infinite relish his breakfast of eels. He made himself quickly at home, and during the day gave frolicsome tokens that everything was O. K., so far as he was concerned.

The present is the third whale that has been in the Aquarium since it was started. The first two where brought to the city in June last, but met with untimely death by sticking their flukes against a projecting pipe in the tank. The recurrence of a like accident has been avoided by protecting every exposed portion of iron with buffers of sponge. "Le Grand Coup," the present occupant, was captured about the latter part of July, at St. Paul's Bay, on the lower St. Lawrence, by Mr. Z. Coup, brother of the manager, and a party of Canadian fishermen. After the death of the first two whales, Mr. Coup returned in June to the scene of his spring labors. An immense pit was dug at low tide, surrounded by stakes, with corral leading from it. About a month later, the whale, now in this city, made his way at high tide into the inclosure, and was captured when the tide fell. During this time the hunters had captured a calf whale, too young to feed, and a sperm whale forty feet in length. The latter was so violent that he had to be harpooned, and the calf died from want of nourishment. During "Le Grand Coup's" captivity he was fed on small cod and herring. About a week since he was taken to Quebec in a schooner. Here he was transferred to a special car, being placed in a large box for easier handling. Another car was provided with barrels of sea water, the contents of which were used to keep his flukes wet ; in this manner he was carried from Quebec to Montreal, where he remained Saturday. On Sunday he again started by special train via the Grand Trunk and Vermont Central and Harlem to New York. His journey was heralded in advance, and at every station crowds of sightseers were gathered, and in conjunction with the local press grew enthusiastic over his progress. Le Grand Coup is about eighteen feet in length, of a grayish white and unknown weight. His present home is thirty feet in diameter, contains 30,000 gallons of sea water, and is emptied and filled every twenty-four hours. He seems to be sociable and to be willing to afford his numerous visitors perpetual recurring glimpses of his royal person. He is a good feeder, and, as he devours a bushel and a half of eels daily, threatens, in conjunction with the sea lions, to create a famine in the fish market.

The interest excited by the arrival of this sea monster is more than local, and when the American public come to understand the true nature of the effort which has resulted in its capture, still greater praise will be awarded to the manager of the Aquarium for his achievement. So soon as the announcement of Le Grand Coup's arrival had been sent over the wires, the following despatch of congratulation was received by Mr. Coup, from John A Cockrell, editor of the Cincinnati Enquirer and other western journalists.

Cincinnati, Oct. 13th, 1876.

To W. C. Coup, Manager of the New York Aquarium.

Your western friends send congratulations on the success attending the opening of your Aquarium. Your pluck, enterprise, and devotion to the grand undertaking entitle you to heartfelt congratulation. A whale swallowed Jonah, but you are the only man who ever "couped" a whale. Your success heretofore demonstrates that you are no Jonah in the business, and the whale and big fish understand it.

John A. Cockrell.
A. A. Stewart.
W. W. Cole.
L. McGleason.

To this kindly greeting Mr. Coup returns the following reply :

To Messrs. Cockrell, Stewart, Cole, McGleason, and Jones, Cincinnati Enquirer Office, Ohio.

Thanks for your congratulations. Our *Coup d'essai* came near receiving a *Coup de grace* by the death of our first whales. The first receiving a *Coup de soleil*, the other gave a *Coup de peil*, and expired broken hearted. This was a serious injury to the *Coup de theatre* of our Aquarium. Only by a *Coup de main*, and a harvest of money could another be obtained. Having succeeded, could I justly call it a *Coup de maine?*

W. C. Coup.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

Well my young friends I wonder how many of you have been to the Aquarium since your Uncle Octopus wrote to you last? Those who have been there now know that he has not told them any "fish stories," though he did tell them stories about fish.

Of course, those who went saw the whale, the wonderful white whale that swims around his glass walled prison all day long, and never stops or turns his head, except when he wants to catch an eel and eat it. And now that we are talking about the whale, let me see if you can guess a conundrum that some one of the wise men at the Aquarium asked your Uncle Octopus the other day, and which he was not smart enough to guess; this was it: "Why is the whale at the Aquarium like a water lily?" and when your stupid Uncle had almost gone to sleep trying to guess it, and at last had to "give it up," the wise man looked wiser than ever, as he gave this answer: "The whale at the Aquarium is like a water lily because both of them have to come to the top of the water to blow." That seemed to me a pretty good one, and I thought if a sight of a whale in a tank makes a man as smart as that the oftener he sees it the better. But do not think that the whale is the only wonder to be seen at this place; just look at the last page of this paper, and begin reading the lists that are there, and when you come to a name that has a star like this * after it, just look inside the paper and you will read what will make you wiser than you were.

Of all the funny fish in this funny place, the balloon fish is the funniest; you will see it in one of the tanks near were the fish eggs are. It looks like a pin cushion with wings, and goes swimming through the water like a little live pineapple. Then again there are the Sea Ravens; the guide will tell you where they are, but when you have found them I should not wonder if you got down under the table for fear of being frightened to death at the sight of such an ugly thing alive. You must see the Hermit Crabs too, but before looking at them, just read what is told you on this page about their queer ways and manners. I declare I had almost forgotten the strangest fish of all. You will find him in a big tank all by himself, and his name is the "American Angler," and you may also read about him in this very paper.

Before your Uncle Octopus stops his wise nonsense we would like to know who has seen him and what he looks like. One little friend at the Aquarium, the other day, said he knew who Uncle Octopus was, and then pointed out a mild looking gentleman with a head a little bald on top, and a queer twinkle in his eye. I wonder if he was right? No matter whether he was or or not so long as he does his best to please you all, for whether he's a man or fish he is still

Your affectionate

UNCLE OCTOPUS,

THE SEA SHELL.

1.

"Listen, darling, and tell me
What the murmurer says to thee;
Murmuring 'twixt a song and a moan,
Changing neither tune nor tone."

2.

"Yes, I hear it—far and faint,
Like thin-drawn prayer of drowsy saint;
Like the falling of sleep on a weary brain,
When the fevered heart is quiet again."

3.

"By smiling lip and fixed eye,
You are hearing more than song or sigh:
The wrinkled thing has curious ways—
I want to know what words it says."

4.

"I hear a wind on a boatless main
Sigh like the last of a vanishing pain;
On the dreaming waters dreams the moon,
But I hear no words in their murmured tune."

5.

"If it does not say that I love thee well,
'Tis a senseless, ill-curved, worn-out shell.
If it is not of love, why sigh or sing?
'Tis a common, mechanical, useless thing."

6.

"It whispers of love—'tis a prophet-shell—
Of a peace that comes and all shall be well;
It speaks not a word of your love to me,
But it tells me to love you eternally."

GEORGE MACDONALD.

THE HERMIT CRAB.

Trust Not to Appearances.

A gentleman who went to live on the coast of Florida started out one day to collect small conch shells. He found them very plentiful, and having filled his pockets started for home. After walking a short distance, he thought he felt a movement in one pocket but did not pay much attention to it. Soon he felt a strange sensation between the shoulders, and in one sleeve, and in a moment his coat seemed to have taken life. Thinking of snakes and all horrible reptiles, he tore off the garment and found a colony of Hermit Crabs traveling in all directions with the conch shells on their backs. These queer little fellows have no homes of their own but inhabit the deserted shells of mullusks, and in this instance had taken posession of the little cones. When frightened or threatened with danger they retreat so far into the shell that one will often think it empty.

They seem to have but one serious trial in life, and that is the protection of their fleshy tail; they are obliged to keep it buried in the inmost part of the shell. They live in it and expose only the fore part of their bodies and claws which are hard.

They move at all times with their houses on their backs, and seldom leave them except when the looks or the smallness of a shell suggests a change. When they see a shell that takes their fancy they turn it over and examine it very carefully, then jump out of their old home and whisk into the new one, tail first. "Soldier Crabs" they are sometimes called because of their constantly fighting among themselves; they are, indeed, "crusty customers." Its the easiest thing in the world for one hermit to get in trouble with and have a fight with another, and the dead hermit is always eaten by his companions. If an attempt is made to remove one of these little "Knights of Armor" from his shell, he clings with great tenacity by means of a pair of hooks at the end of his tail, and often allows himself to be torn to pieces rather than loosen his grasp. If placed in impure water they will leave their shells, and having caused them to do this, I have placed them back in the aquarium and lent one shell, for the possession of which a spirited battle always took place. They are very useful in a tank as showing signs of ill health. As soon as the water begins to turn bad they will leave their shells and climb up the rocks and seaweeds nearest to the surface of the water. They are the cleanest of housekeepers, and will never allow the floor of their tank to become soiled. Feeding either on vegetable or animal substance, they are but little trouble in a tank, and their constant tricks and quick, comical motions make them a source of great amusement. Pagurus longicarpus is the scientific name of the common Hermit Crab, which high sounding title should at least entitle him to some respect.

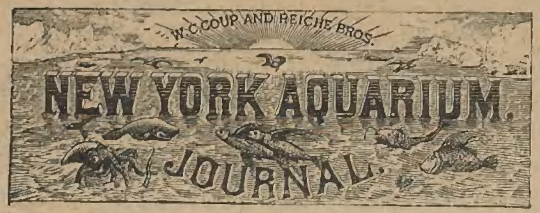
When Dr. Holder was residing in Florida, he had a land Hermit Crab take up his residence under the office floor. He came out through a hole in the floor every day, and would climb up the leg of a table and drink from a dish of water placed there for him.

This crab became so very tame that he would allow persons to handle and feed him. The Doctor, when traveling, placed him in his trunk for safety. It our young friends who visit the Aquarium will search out on the last page of the Aquarium Journal the place where tank H stands, they will find the tank itself, and thus will see many of these odd crabs and their queer names.

A. W. ROBERTS.

* * *

A BOSTON BOY ON FISH.—A smart Boston boy writes the following;—Fish lives in the Atlantic Ocean, Buzzards Bay, and some in Charles River. When they are small they are codfish, herrin', and sich; when they grow up they are whales. Whales is very useful; they sometimes swallows a whole ship and all the crew. The fat of whales is biled out and made inter kerosene oil for gaslight. Their bones is made inter whalebone for ivory pianner keys and dominoes, also for horn handles for jack knifes. I wish a whale would swaller my school and all the teachers. Fish is always eat Friday. I hate fish; there is so many bones to pick out when you eat 'em. I ruther eat a paper of pins fried in lard. A whale could lick all the boys in the Harvard Grammer School. Could lick thunder out of 'em and make 'em sick, and don't forget it.


W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL.

W. S. WARD, Editor.

NEW YORK, OCTOBER 25, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

OPENING OF THE NEW YORK AQUARIUM.

In this, the second number of the Aquarium Journal, the pleasant duty is accorded us of announcing the successful opening of the New York Aqnarium. In accordance with the public announcement, the inaugural exercises took place on the evening of the 10th of October. At that time the invited guests were present, over fifteen hundred in number, and if the evident satisfaction expressed by them may be taken as an index of their honest approval, the New York Aquarium at once takes rank among the most charming and instructive places of popular amusement in the world. For the benefit of those who were absent, and yet desire to be informed regarding the proceedings of the opening night, and also in the interest of the guests who may desire to preserve a record of the evening's entertainment, we herewith present the complete report of the proccedings.

The evening of the 10th of October was such as to favor all the hopes of the Aquarium managers. A perfect day followed by a cloudless night, and precisely at the appointed hour the distinguished guests began to arrive. The moments preceding the formal welcome were occupied by the guests either in viewing the tanks and their contents, or in securing favorable places from which to listen to the address.

Promptly at eight o'clock the attention of the guests was requested to the opening address, the speaker being Hon. ROBERT B. ROOSEVELT, of this city. As consistent with the distinguished services rendered by Mr. Roosevelt as chairman of the New York State Fish Commission, the subject of address was "The Rise and Progress of Fish Culture." The following is a full report of

Hon. R. B. Roosevelt's Address.

LADIES AND GENTLEMEN:

Less than thirty years ago two humble fishermen of France made a discovery, which, in importance to the world, is surpassed by no discovery of ancient or modern times. Up to that period people had cultivated the land, thereafter they were to cultivate the water as well. Bread was to be won by the sweat of the brow no longer from the earth alone, but from the sea also. Three-fifths of the world's surface was a waste of water; the genius of those men decreed that this waste should blossom with fertility. From early days the educated and scientific had devoted their attention to the creatures which inhabited the waters equally with those that inhabited the land. Their Peculiarities of structure were pointed out, they were grouped together in classes, arranged somewhat as to habitat and given scientific names. The system had been so well carried out, as far back as the days of the Romans, that Latin is still retained as the language of natural history. Every point in connection with fish was studied except their propagation. Land animals had been raised for food by man as far back as the earliest traditions. It remained for the nineteenth century to conceive the idea of raising fish. Since the discovery of which I speak, the utmost interest has been manifested in all that relates to the habits, growth and increase of fish. Civilized nations everywhere have turned anxious attention towards what promises such vast results for the human race. Whoever adds materially to the general information on the subject, is a public benefactor. National and state officials have been appointed to give it their attention, and private associations have been formed to aid in the investigation. The public mind has been exercised, and every step forward, in what has now become an actual science, is hailed with satisfaction. There is much to be learned. The present status of agriculture is the result of four thousand years of study. Pisciculture has grown to its present proportions in thirty years. To properly conduct the system it is of the first importance to understand the habits of fish, their times and places of spawning, the length of time required for the development of the egg, its peculiarities and characteristics, the temperature and nature of the bottom, and the kind of food best adapted for both young and old. On these subjects we know something in reference to certain species. Special attention has been devoted to the salmon idea, above all to the salmon and trout, which are the most highly prized of all the tribes of fish, as they are valued not only for the table, but for sport. Of other species we have a more or less thorough knowledge, but as to many we are still in the darkness of ignorance, and whatever will tend to give us light is a public boon.

There is no better way of studying many of the peculiarities of fish than by the means of aquaria on a scale large enough to give free play to their habits. The little gold fish, living in his globe, embowered in water weeds, offers us valuable suggestions. His unchanging size, scarcely developed in years, tells us that, although fish may live in confined water, to grow they must have proper range. He says to us, also, that aquatic plants purify and reinvigorate the water as trees and verdure do the atmosphere. The larger and more valuable species can be made to disclose secrets equally important. Man cannot follow the fish in his own element, he cannot leap into the brook with the little salmon sprat, where amid the mountains hundreds of miles from the coast he begins his existence; nor accompany him thence in his migration down into the brine and out into the mighty ocean; cannot sport with him among the coral caves and chase the minnow and shrimp on which he feeds; nor return with him when the hour comes for him to propagate his race. Man can do none of these things, but man can bring the fish in his native element before him and expose his ways and his doings to the light of day. In that way Aquaria can be of great use. As a mere matter of amusement nothing is pleasanter than such a study; as a question of investigation few things are more important. The countries of the old world vie with one another in the extent and appointments of their aquaria and to day for the first time America is not far behind the foremost of them. Look around you and you must be struck with the excellence and completeness of the arrangements. Full accommodations are provided for the salt as well as for the fresh water varieties and even for hatching the eggs and raising the young. A complete description of these, however, is not within the province of my remarks and will be left to others. I desire to add a few words only to show more pointedly the public importance of the subject and the benefits which may be expected to flow from an investigation carried on under these more advantageous circumstances.

Years ago when fish culture was first commenced among us, an earnest effort was made to determine precisely when and where striped bass *voccns lincatus* were in the habit of spawning. But our efforts were essentially failures and to day we know but little more than we did then, although we have hatched some of their eggs. Possibly the bass had prejudices against our methods and preferred their own, but, whatever may be the fact, they certainly have left us in the utmost confusion. Some appear to spawn in spring, others in summer; some seek the fresh water, others remain in the salt; finally quite a number to all appearance never spawn at all. Now, if Mr. Coup's Aquaria will settle this question I will promise to erect a monument to him in the Central Park.

This is but one of a thousand vexed questions which this establishment may answer in full or partly. The best temperature of water for certain varieties can be determined accurately, for you must know that trout will perish in water heated only to that degree which shad require, and that the warmer blooded fishes would die in the cold spring brooks of the trout. The sorts of food, too, required for each species for their best development at the least expense, even this can be approximately determined in tanks so large as some of these, and many other matters of as grave import. Enthusiasts in fish culture predict that as a science it will prove more useful and profitable than agriculture and they have some grounds for their assertion. The fecundity of fishes is astonishing. An ordinary trout will produce two thousand eggs, a salmon ten thousand, a white fish twenty thousand, a shad thirty thousand and a herring hundreds of thousands. The eggs of a sturgeon have been counted and amount to 7,635,200, and those of a cod-fish to 9.344,000. The New York Commission has taken from a single sturgeon half a million eggs merely as an experiment and hatched them all. A sturgeon will grow to the weight of two hundred pounds. Imagine the results of multiplying 200 by 7,635,200, as the result of a single pair of mature fish and you can form an opinion as to the probable future importance of fish culture. You may wonder that under such a rate of increase there ever could be a scarcity of fish or a diminution of the supply, but by the natural method the eggs are subject to numberless vicissitudes. From the moment they are extruded they are exposed to enemies and dangers innumerable. Like the seed that fell by the wayside or on the arid ground or among the weeds or which was devoured by birds, so fish spawn left to its ordinary fate is destroyed by sediment, eaten by water, foral and aggressive fish attacked by disease affected with fungus, smothered for want of æration and damaged in so many ways that it is computed that but one in a thousand ever come to maturity. By the artificial method all these dangers are prevented, fungers and sediment are removed, predatory forals and fish are not allowed to enter. Man's intelligence guards the eggs so that they all hatch or practically all, two per cent. being an excessive loss. When a fish deposits 10,000 eggs only ten fish are born into the world by the natural method; by the artificial plan 9,800 are produced. These start in life as well off as the ten of the other system and the results of fish culture compare with the ordinary production as one thousand to one; can as much be said of agriculture. But again fish require no food, no manure, no kind of cultivation; they are born and go down to the sea and draw on nature's inexhaustible storehouse of plant and animalculæ life, grow and wax fat and return ready to be killed thus offering to the poor of all the world abundant and excellent food. In coming together to night we are lending a hand in the good work of bringing about so desirable a result."

At the close of the address, which was fully appreciated by the audience, Mr W. S. Ward gave a brief descriptive account of the history, purpose and construction of the Aquarium. At the close of Mr Ward's remarks the assembled guests were free to listen to the music of Dodworth's Orchestra; study more critically the inhabitants of the tanks; or present their compliments and congratulations to Messrs. Coup and Reiche Brothers, proprietors of the New York Aquarium.

Following this interval of social intercourse was the announcement that supper was to be served. At once the richly loaded tables, which had been awaiting appreciative appetites, were the centres of attraction. The bill of fare was so unique and enticing that it deserves to be placed on record, and with it the grateful acknowledgement of the managers for the assistance rendered and the contribution to the "Menu" made by the United States Fish Commission.

MENU.

SOUPS.

Green Turtle, a la Blackford.
Bisque of Lobster, Seth Green Style.

HORS D'ŒUVRES CHUD.

Bouchees of Craw Fish, a la Remy.
Fried Oysters, Ferguson Style.
Fried Scollops, a la Edmunds.

HORS D'OEUVRES FROID.

Mackerel in Oil—Norway. Mackerel, Fried—Norway.
Halibut—Norway. Salmon—Norway.
Pink Fish Norway. Canned Mackerel—Norway.
Anchovies—Swedan. Mackerel—Swedan.
Conger Eel—Portugal. Squid in Oil—Portugal.
Sardines in Oil—Portugal. Sole in Oil—Portugal.
Congro in Oil—Portugal. Mackerel in Oil—Portugal
Conger Eel with Tomatoes—Spain.
Sardines in Oil—Spain. Mixillon—Spain.
Sardines in Vinegar—Spain.
Fried Bass—Spain. Botargo. (Mullet Roes)—Turkey
Cray Fish. Cape of Good Hope—Africa.
Shake. Dried Salmon—Japan. Sardines—France.
Anchovies—France.
Tunny—France. Salmon—Holland.
Shark Fins, Black—China. Shark Fins, White—China.
Oolachans—Alaska. Sardines—Italy.
Caviar—Russia. Poisson au Blanc—Russia.
Caviar—California.
Dried Octopus Eggs—China. Dried Fish Maws—China.
Sword Fish—Portugal.

RELENEES.

Striped Bass, a la Brevoort. Pompano, a la Reeder.

ENTREES.

Caisse of Terrapin, a la Norris. Deviled Crabs, Gill's Style.
Filet of English Soles, a la Buckland.
Turbot, a la Whitcher.
Timbali of Frogs, a la Cost.

VEGETABLES.

Potatoes, Parisienne. French Peas.
French String Beans. Stuffed Egg Plants.

ROAST.

Sheep's Head, Agassiz Sauce. Blue Fish, a la Goode.

COLD PIECES.

Aspic of Eels, a la Huxley. Buisson D'Ecrevisses, a la Atkins.
Salmon, a la Baird, Beurre de Montpelier.
Lobster Salid.

DESSERT.

Pudding, a la Neptune. Napolitan Ice Cream.
Kan-ten Japanese Sea Weed, a la Sekizawa Akekio.

ORNAMENTAL PIECES.

Bateau de Pecheur, a la Roosevelt.
"Fisherman's Luck," a la Shephard Page

FRUIT. CHEESE. COFFEE.

CULINARY ARTISTS, G. E. GREENE AND SONS.

The above Bill of Fare furnished by U. S. Fish Commission

In addition to the many congratulations delivered in person, Mr. Coup was in the receipt of letters from various quarters, the gratifying tone of which may be understood by the following:

Washington, October 7, 1876.

"W. C. Coup, Esq.—Dear sir: I regret very much that my engagements are such that I cannot accept your kind invitation to be present at the opening of the New York Aquarium on Tuesday next, but I beg leave to embrace this occasion to congratulate New York on the success of an enterprise which affords a rational source of amusement and instruction to its citizens generally, and particularly a means of original research to students of natural history.

"I am especially pleased with that feature of your plan which provides a scientific laboratory and library furnished with all the useful appliances and books to carry on original investigations. The invention of aquaria, by which the habits and actual life of animals can be studied from day to day while in their native element, affords a means of advancing a knowledge of natural history entirely unknown until within a few years past. and the providing of a free laboratory and library in connection with an establishment of this kind cannot be too highly commended or too liberally sustained.

"With my best wishes for the entire success of the scheme, I remain, yours very truly,

Joseph Henry, Sec'y Sm. Institute.

"Cambridge, Mass., October 9, 1876.

"W. C. Coup, Esq.—Dear Sir: I am sorry I cannot be present at the opening of the new aquarium, and I shall take the first opportunity when next in New York of seeing it.

Yours truly,
A. Agassiz.

Utica, Sept. 9th, 1876.

W. C. Coup, Esq.

Dear Sir: Your kind request to be present at a private opening of the New York Aquarium, has been received. Thanking you therefor, I am compelled to send you my regrets, because of my inability to be present, and I avail myself of the opportunity to express my earnest desire for the abundant success of your most laudable and useful enterprise.

I am very respectfully yours,
Scott Lord.

Grace Church Rectory.

W. C. Coup, Esq.

My Dear Sir: I have to acknowledge the courtesy of your invitation to be present at the private opening of the New York Aquarium tomorrow evening.

If I do not accept it, it will not be from any want of interest in your enterprise, but because I am likely, on Tuesday evening, to be absent from the city. But whether I am absent or present, I shall feel the heartiest interest in the success of your undertaking. It is one which cannot but exercise the happiest and healthiest influence upon such a community as ours, and I cordially congratulate you upon the energy with which, under repeated discouragement, you have persevered in it. I am, dear sir,

Faithfully yours,
Henry C. Potter.

WHAT WE ARE DOING.

In the first number of *The Journal* our readers were fully informed regarding the history of the New York Aquarium; the plan of its construction; and its proposed purpose as an important educational and entertaining place of popular resort. Having thus made the public acquainted with what has been done, we are prompted to briefly refer to what we are now doing and what it is proposed to do in order to retain the favors which have been so generously accorded to us;

To build an aquarium is by no means an easy task, and as is demonstrated elsewhere in these columns, is a work calling for patience as well as energy and wisdom. And yet when once built the labor of sustaining and supporting it is an equally important and arduous one. Let it be remembered that an aquarium, in order to be perfect, must be complete, and must therefore contain as many varieties of marine forms as it is possible to obtain. Visitors from all parts of the land will view the work, and each will look for some favorite member of the finny tribe with the forms and habits of which he is familiar. To fail in gratifying this desire is to take rank in that individual mind as an incomplete work. And it is in order to prevent this judgment that the following extensive preparations have been undertaken by the managers of the New York Aquarium, which arrangements relate solely to the collection of fish, as the plans for their proper exhibition and maintenance belong to another though equally important department.

Beginning with a list of special stations and those in charge of them, we find that they are as follows:

Detroit,	Michigan,	E. B. Paxton,
Ecorse,	"	J. B. & G. Clark,
Cincinnati,	Ohio,	A. A. Stewart,
Sandusky,	"	Louis Zitsel,
Columbus.	"	C. Muller.

We also have at Hamilton, Bermuda, a special agent who has the gratuitous assistance of Mr. C. N. Allen, the United States Consul.

In addition to these resident collectors, there are special stations established and regular collectors at work at the following points:

Menemsha Bight, Mass.,
Wood's Hole, "
Cedar Keys, Florida,
Isle aux Coudres, Gulf of St. Lawrence,

An important expedition has also been engaged on special service on the Pacific coast, the main object of their search being for such monsters as the sea lion, walrus, etc., while still another party has been sent to the Florida coast with instructions to procure, at any cost, an Octopus, or Devil Fish.

In reviewing this list it should be noticed the above-mentioned services relate merely to the securing of objects within their own district. When obtained *special* agents are despatched to bring them to the Aquarium, a work which can only be successfully accomplished by those experienced in the methods of handling and transportation which are required.

Finally, a corps of active and experienced collectors is constantly in attendance at the Aquarium, either to act as assistants to the superintendant and naturalist, or as special collectors.

The following is a list of those who are thus engaged and are subject to the orders of Mr. W. C. Coup, the Manager of the institution.

PROF. H. D. BUTLER	Gen'l Sup't.
MR. W, S. WARD	Naturalist, And Director of Educational Department.
MR. C. F. HOLDER	Assistant Naturalist.
MR. FRED. MATHER	Sup't of Fish Culture.
MR. A. W. ROBERTS	In charge of Fisheries.
F. T. VANCE	Illustrative Artist.

FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Only two troughs are in use at present and are filled with the ova of the California Salmon which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalist's the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years, but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, accordingto the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Later in the season the other troughs will be occupied by the Land-locked Salmon from Maine, a fresh water variety, the Lake Trout, the Brook Trout and the Whitefish; these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it a useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.

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COD.—Gadus Morrhua.

Every one is familiar with this fish from the number almost always present in the fish-shops and markets. Lying on a slab with huge head, gulf-like mouth, with pendant barb and dull staring eyes, it is by no means a lovely object. Judging it by its appearance in death, one would suppose it a mere stupid mass of animated matter, whose only purpose in creation was to eat incessantly, and be eaten when gorged enough. But the Cod, on the contrary, is a most intelligent fish, capable of friendship with its guardians and feeders.

In Mr. Buckland's work, "Familiar History of British Fishes," page 126, published by the Society for the Promotion of Christian Knowledge, 77 Great Queen Street, Lincoln's Inn Fields, is a description of the tame Codfish at Port Logan, Scotland. These fish are kept in a pond cut out of the solid rock, the entrance and exit of the salt water being guarded by an iron grating. The fish are kept here, and taken when required for the home use of the proprietor, General McDonald, late 2d Life Guards.

Very remarkable substances have been at times found in the stomachs of Cod—for instance, a large piece of ship's tallow candle, a bunch of keys, a guillemot, feathers and all, and whitings to the extent of eight pounds at a time.

Records are also known of the large size of the Cod. One was taken at Port Knocke which weighed 60 pounds. This fish had no melt or roe, and no food in the intestines. The length was four and a-half feet, and three feet round the thickest part. The head was one and a-half feet in length, and weighed 15 pounds. This was undoubtedly the largest Codfish ever taken in British waters. Cod's food consists of shellfish, crabs, and worms; but, as it is perpetually hungry, it will devour smaller fish, as herrings, sprats, lampreys. It is caught with a hook and line baited with some of the above mentioned fish, and such is the enormous quantity taken, that the celebrated fishing ground called the Banks of Newfoundland, gives employment to a fleet of boats, whose gross earnings amount towards one million dollars. Its liver contains a valuable oil, greatly used in cases of debility. Cod are very prolific; a Cod's roe weighing seven and three-quarter pounds will contain nearly 7,000,000 eggs. These are deposited on the surface of the water, as has been proved in the Brighton Aquarium. In about sixteen days the young fish are developed, though the open sea is a very insecure place for baby-fish; a multitude must survive to furnish the perennial supply our fishermen bring to shore. Codfish can be kept alive a long time. At Fulton Market they are placed in perforated boxes and moored in the docks.

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THE SEA SWALLOW.

Dactylopterus volitans.

In tank c we find this bird-like member of the finny tribe. Upon examination the head appears to be encased in a bony armor, while the remainder of the body is covered with minute scales, that form a strange contrast to the former. It, however, needs but little defense, as the pectoral, or side fins are developed to a wonderful extent, rendering it able to rise from the sea and skim over the surfaee after the fashion of its terrestrial namesake. With such force do they move, that they have boarded a vessel and striking a sailor upon the forehead, fairly knocking him down. They belong to the curious family of Gurnards, and strange tales are told of *sounds* that they produce under water, but the question is still open to the speculations of physiologists. Prof. Baird was fortunate in witnessing this phenomenon, and expressed an opinion that it originated in the belly of the fish. Dr. Davy discovered flat, grinding teeth in the œsophagus of the *Red Gurnard*, and it is probably by a peculiar movement of these that the *strange language?* is produced. In appearanee, the Swallow is very attractive, especially in the sun light, when the beautiful bluish iridescent colors of the "wings," and the flesh colored ventral fins come out in bold relief and mark it as one of the most attractive of its kind. It is found occasionally in New York, and has a wide geographical range. It feeds upon the small cruestacea that the sea *affords*.

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THE SEA RAVEN.

Hemitripterus Americanns.

Closely connected by family ties to the Sea Swallow, is the Sea Raven, several fine specimens of may be seen in table tank d, and it is always surrounded by *doubtful* admirers who speculate as to the *ownership* of the wonderful tufts, "bobs," and masses of disjointed flesh that seem to cover it, and the visitor is not rarely led to believe that by a system of inactivity it has been covered with a growth of aquatic plants and verdure. But they are all "real," and this fantastic ornamentation is the bona fide work of nature. The specimens in this tank were captured near *Gay's Head*, Mass., and are there known as *Sculpins*, and make sad work with the lines of the patient fisherman. It is subject to great variation of color, and the Aquarium will soon possess specimens, varying from the rich, russet brown to a bright *carmine* yellow and red. They feed entirely upon small fish, but do not reject any morsel that their capacious mouths can cover.

THE AMERICAN ANGLER.

Lophius Americanus.

The American Angler or Fishing Frog, recently received at the Aquarium, is one of the most peculiar and unique forms found in the sea. The peculiar analogy it has to the movements of the fisherman, give rise to its name; and it certatnly deserves it, as a more perfect imitation of the *angler* can scarce be found. Nature has adapted it perfectly for its peculiar walk or *step* in life, as being a drowsy, lethardic individual, it is unable to secure food by active movements. Here Nature comes to the rescue, giving it the general appearance of a moss-covered rock. The color is olive brown, faintly mottled fin and quite completes the delusion.

Around the lower jaw that protrudes beyond the upper, hang a numerous grove of barbels of flesh, that are not unlike the fern in shape, in fact an exact imitation of vegetable growth, so that in a slow movement of the tide the moving of leaves can easily be imagined. The first dorsal fin is greatly lengthened in some cases to eight inches, and upon its extreme tip floats a soft inviting bit of membrane that is the bait of *this Nature's fishing rod.* And now to catch the fish; the "Angler" hunts out some secluded spot among the sea weed and flattens its unwieldy form upon the bottom and defies detection, being of the same color as its surroundings. The rod or first dorsal is now raised and the luscious bit dangled over the huge mouth. Soon an unsuspecting (perhaps relation) ventures near. The rod is slowly raised; the victim follows until within reach of the ponderous jaw. Like a flash the under one shoots out, a *quasi vacium* is caused; and the unfortunate victim is sucked in, and the cruel teeth close upon him, and one more fish has paid the penalty of the chances of life.

In this manner the laziest of fish is helped along by nature. If the visitor is not fortunate in seeing it, opened mouthed, it will well pay him to await such an ordeal. In the present specimen this orifice equals in width half the length of its body, and presents more the appearance of a great hole than a receptacle for food. In the upper jaw will be seen a single row of long slightly re-curved conical, unequal teeth on each side, accompanied by a double row of large ones. The lower is *ornamented* with a single row of long, acute teeth, and larger ones mounted upon the vomer and palatines. As if not satisfied with this armory, two large rows of teeth are found on each of the lower pharyngeals, which are thrown so far forward that the ordinary observer would certainly believe that its very tongue was covered with teeth. The dorsal fin, from which it derives its name, is composed of six rays, of which the three nearest the mouth are distinct and detached, forming in fact, three fishing rods, one baited, while the others like other fishes are connected by a membrane. The first ray, as we will call it, or baited rod is moved by a wonderful arrangement, and can only be appreciated by an examination in the dissecting room. According to Baily, it is controlled by twenty-two distinct mnscles, and so can move in any direction at the will of the fish. They are found upon our coast, and upon the New England shores in numbers and of great bulk and are the bane of the fisherman, often forcing their huge forms through the strongest nets, setting at liberty the entire haul. It is known by many titles, viz., the Sea Devil, Fishing Frog, Bellows Fish, Goose Fish and Monk Fish, but the name given above certainly most applies to this Lazzarone of the sea. The specimen on exhibition in the tank is about three and a half feet long, and resembles a flattened, bulky mass of something that would not attract general attention were its peculiar points not dilated upon. They feed upon small or large fish, as few are too large for their capacious maw; and so greedy are they that many members of the finny tribe are engulfed alive, thus giving them a slight chance of commercial value, as the fisherman often cut them open and secure the prize so lazily won.

HERMIT CRABS.

Scattered at intervals on the shingle bottomed tank (h) or in closely collected groups, will be seen numbers of those quaint Crustacea, remarkable for their habit of approaching the deserted shells of other animals, for the better protection of their otherwise tender and defenceless hinder quarters. This foregoing peculiarity has won for them the popular title of Hermit Crabs, although on account of their extremely irritable and pugilistic disposition, they are about equally well known as Soldier Crabs. The Hermit Crab (*Pagurus bernhardus*), is most frequently found, when young, inhabiting the cast-off shell of the Dogwinkle (*Purpura lapillus*), and at a more advanced condition of growth than that of the Common Whelk (*Buccinum undatum*). The process by which the Hermit Crabs have gained possession of these highly ornament villa residences, in place of their former sybaritic hut, is an artificial one, each individual having been originally extracted from an ordinary Whelk shell, and left in company with others of a foreign type from which it almost immediately made a selection. On the shores of tropical seas, Hermit Crabs normally inhabit these brilliantly-colored and fantastic-shaped abodes, including also the beautifully-spotted and naturally highly-polished Cowries; in this latter instance, the species of Hermit has a specially flattened body and general contour to enable it to utilize these remarkably narrow-apertured shells as a suitable protection.

LOBSTER.

Homarus Americanus.

The Common Lobster is a well-known member of the Crustacea. Its color is blue-black, flecked and clouded in a most elegant manner, but after boiling, it becomes of an almost uniform red. Its structure follows that of the *genus*, which has been treated generally. Its claws are powerful weapons, and are remarkable for being dissimilar. One is larger than the other, and one is furnished with saw-like elevations, the other is marked by rounded knobs. The wounds produced by the saw-shaped claw are very painful and difficult of healing. The Lobster is extremely nimble, and darts with a propulsion of the tail upon its prey, or evades pursuit with a surprising celerity. If endangered by an enemy, it penetrates into crevices in the rocks much smaller than its apparent bulk. It is very combative with its own species, and after a fierce encounter, the conquered frequently retires minus one or more limbs. But as these grow again, the damage is not of a mortal kind. It is very voracious, and this aids greatly in its capture, for it cannot resist the bait which is laid for it. The traps are made of basket work or pots, and the numbers caught are enormous. It is found on our northern coasts, even to the extreme north, and grows under favoring condition to a great size, some having been taken sixteen pounds in weight. It is most prolific, as may be observed from the mass of dark spawn often found clustered under the abdomen. If this were carefully gathered for the purpose of reproduction, the supply of this most delicious creature would be greatly increased.

COMMON STICKLEBACK.

Gasterosteus Pungitius.

This well-known fish is found in ponds, streams, and rivers, and appears equally suited to salt water. It is extremely voracious. An observer, once standing by the side of an ornamental lake, saw a young frog hopping past. He threw it in a short distance to exhibit its powers of swimming to a young bather, anxious to learn the art. The momemt it reached the surface of the water, a flash of light seemed to be emitted from the bottom. It was caused by a shoal of Sticklebacks, which pounced upon the unfortunate frog with great fierceness. In a few moments the four legs of the poor creature were eaten away, and new shoals came hurrying from more distant parts of the lake to the prey. The battle that took place round the victim was as desperate as could be imagined. Though pelted at with bits of gravel, they would not leave it, but continued to nibble and battle among themselves as long as a particle remained. This instance of voracity is, however, not surprising, for they do not hesitate to devour one another. An illustrated description of the Stickleback appeared in the first number of the Aquairum Journal.

THE SKATE, or CLEAR NOSED RAY.

Raia diaphanes.

Among the inhabitants of the *deep sea* tank, C, we find the Skate or Fluke, known as the "Clear Nosed Ray." Although extremely common upon our coast, they form an interesting object of attention from a peculiar habit of pressing their anterior side against the glass, showing a pure white surface, while the mouth and gill openings form a strong likeness to a flat, old fashioned human face, and tends to create no little amusement at times among its auditors. At times they cover themselves with sand, and only the gentle movement of the gills tells of the life within In the same tank are the peculiar eggs of this fish, called by some "Sea Barrows," from the four appendages that spring from the four corners, and unconsciously seize the grass and algae, thus holding the young skate in position. They feed upon young crustucea, and are consequently unfit for use, the flesh being usipid and gelatenious.

GAR FISH.

Lepidosteus Osseus Liu.

One of the most interesting fish in the large fresh water tank, is the Bony Gar Pike, and here we find a living representative of the old *Ganoid race* that are now only known by their impressions in the hardened sandstones that tell of seas that rose and fell, perhaps millions of years ago. The fish is completely encased in a coat of smooth, thick, and rhomboidal *scales*, an armor equal to any foe. They grow to a large size, often exceeding four feet, and with their long bill armed with needle like teeth, and powerful fins form no mean antagonist to the fisherman or sportsman. They are quite common in Lake Erie, where they are known as the Buffalo fish, a species, probably the same has been found in Lake Champlain. They are fed in the Aquarium upon small *Dace*, and their quick movements in securing their prey render them specially worthy of notice at the time of feeding.

THE AQUARIUM GUIDE.

The following tabulated list is designed, with the assistance of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER SERIES.

Tank A—Whale.

Tank B—Seals.

Tank C—Common Flounder, Cod Fish, Haddock, Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Torpedo or Cramp Fish, Prickly Skate, Summer Skate and Eggs, Sand Shark, Smooth Dog Fish, Ling, Sea Raven,* Green Turtle, Lobster,* Sea Bass, Black Fish or Tautog.

Tank E—Striped Bass, Weak Fish, Crab.

Tank F—Sea Bass, American Angler.*

Tank G—Star Fish, Sea Cucumber, Sea Anemones, (Echinus—Sea Egg), Tube borers, etc. etc.

FRESH WATER SERIES.

Tank H—Common Cat Fish, Blue Cat Fish, Yellow Perch, Sucker, Fresh Water Dog fish, Common pond fish.

Tank I—Yellow Perch, Algal (Brook Pickerel), Shiner, Blue Cat fish.

Tank J—Carp, Pearl Carp, Golden Carp, Mottled Carp, Silver Shells

Tank K—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog fish, Lake Sturgeon, Maskellonge, (Eel Conger) Gar Pike,* Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass.

SALT WATER SERIES.

Tank L—Shoal of Striped Bass, Black fish, Sea Perch.

Tank M—Lafayette Fish, Flounder, Branded Corvina or Red Bass, Blue fish, Young Skate, Black fish.

Tank N—Black fish. Eel; Striped Bass; Manhaden: Lafayette; King Crab; Cod fish, large.*

Tank O—Blue fish, Porgee.

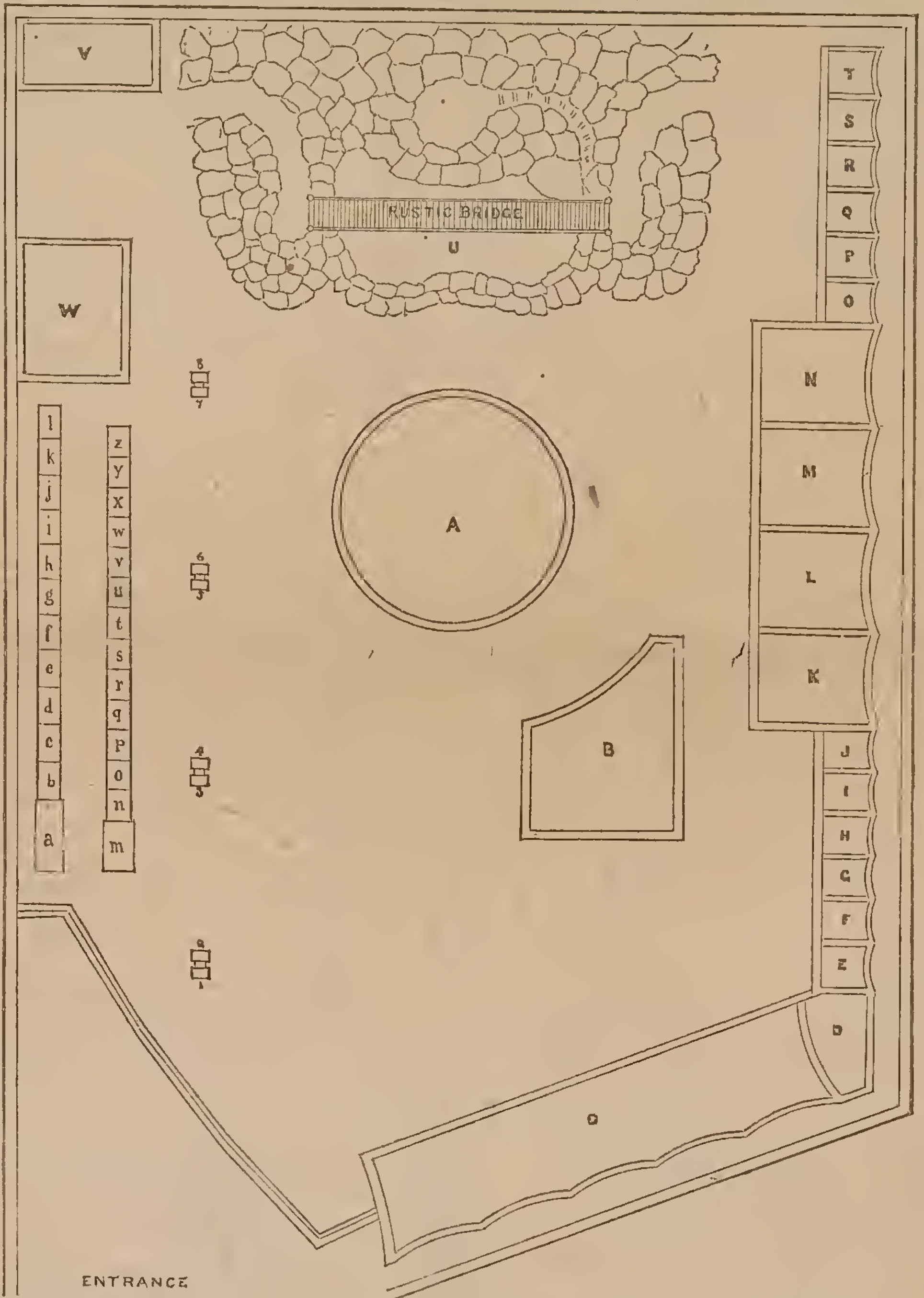
Tank P—Lobster, Lady-crab; Edible Crab, Spider Crab; Hermit Crab;* Spotted Crab; Lobster;* Bermuda Lobster.*

Tank Q—Lings.

Tank R—Rock Cod.

Tank S—Lobster,*

Tank T—Bass; Shad, young; Mossbunker, Fall Herring; Pompino.



Ground Plan of the New York Aquarium.

SALT WATER TABLE TANKS.

Tank b—The Porgies.

Tank c—Gurnards, web-fingered; Sea Swallow*; Killi Fish; Toad Fish; Algae, etc.

Tank d—Sea Raven*; Algae; Gasterpoda; Craw Fish, etc.

Tank e—Butter Fish; Large Spider Crab; Sheepshead Lebias.

Tank f—Butter fish; Spotted Bergall; Black Fish.

Tank g—Lafayette; King-Crab, young.

Tank h—Lady-crab; Hermits.*

Tank i—Young Black Fish; Sheepshead; Lebias; Common Toad fish; Fiddlers; Shrimps; Spotted Crab; Spider Crab.

Tank j—Killi Fish; King Crab; Sheepshead; Lebias; Hermit Crab;* Fiddlers, etc.

Tank k—Algae; Killi Fish; Black Fish; Lafayette; Spider Crab; Fiddlers; Hermit; Edible Crab.

Tank l—Black Fish and young; Algae, etc.

FRESH WATER TABLE TANKS.

Tank m—New York Shiner.

Tank n—Brown Cat Fish; Yellow Perch;

Tank c—Brook Pickerel; Dace for food.

Tank p—Common Pond Fish.

Tank q—Black Headed Dace.

Tank r—Hell Bender

Tank s—Long-eared Pond Fish; Yellow Perch.

Tank t—Dace, young; Young Pond Fish; Young Eels; Turtle.

Tank u—Young Dace; Shiners.

Tank v—Tadpole; Dace.

Tank w—Sun Fish; Catfish; Banded Proteus.

Tank x—Yellow Perch; Pond Fish.

Tank y—Lake Trout; Tadpole, Young Catfish.

Tank z — Brook Trout; Sticklebacks;* Lake Trout; Miller's Thumb.

POST TANKS.

Tank 1—Young Salt Water Green Turtle; Coral; Algae.

Tank 2—Black Headed Dace.

Tank 3—Crimson Spotted Triton.

Tank 4—Fresh water Lobster; Dace, Algae.

Tank 5—Algae; Unio; Munnon.

Tank 6—Dace.

Tank 7—Young Cat Fish, Lobster, etc.

Tank 8—Sea Anemones; Algae.

Tank 9—Sticklebacks *

Tank U—Sea Lion.

Tank V—Brook Trout.

Tank W—Fish hatching troughs.*

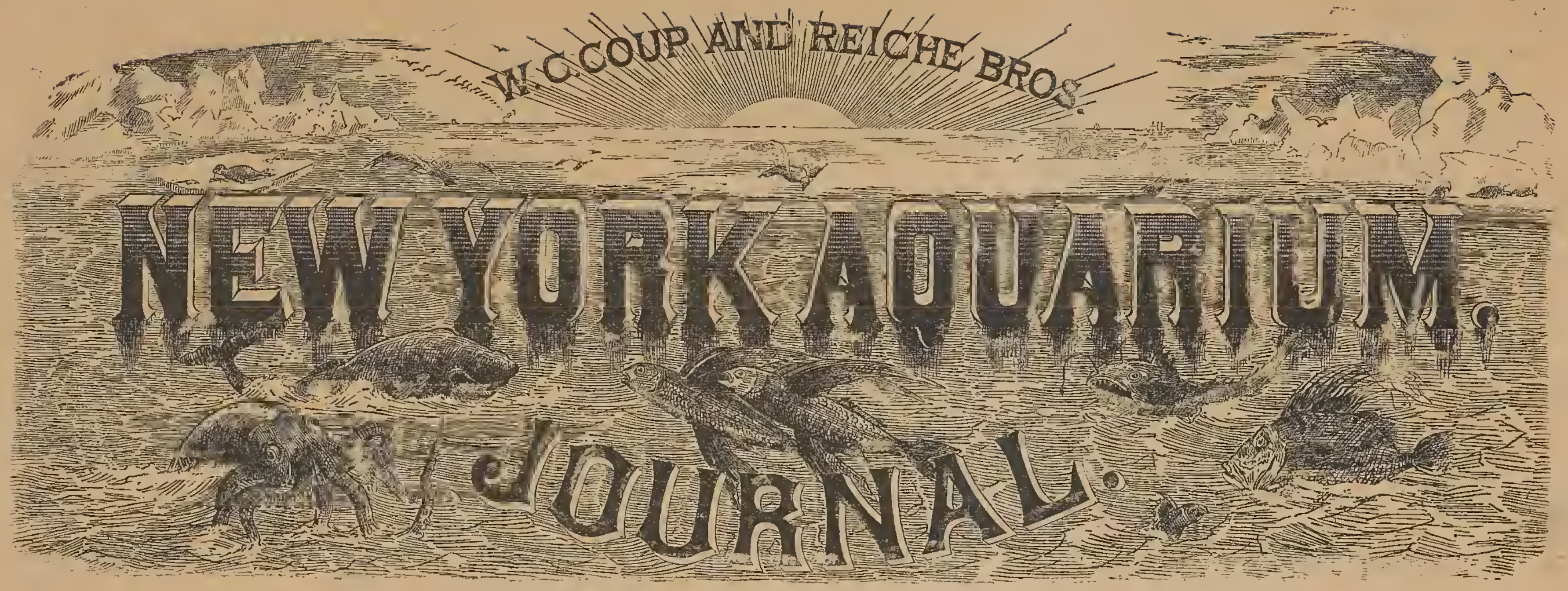
***The Asterisks that follow many of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on pages 14 and 15 of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions.

The Managers of the Aquarium make their grateful acknowledgements to Mr. B. B. PORTER, of Oakland, Bergen Co., N. J., for his valuable contributions to the tanks of the Aquarium. Among the living specimens presented by Mr. PORTER are the following:

Miller's Thumb.	Kennebec Salmon.
Rock Suckers.	Sun Fish.
Yellow Perch.	Rock Bass.
Lake Trout.	Water Plants.

Chub, or River White Fish.

Our thankful acknowledgements are also due to Mr. Furman, of Maspeth, L. I., for the collection of Brook Trout now exhibited in Tank V.


W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM JOURNAL.

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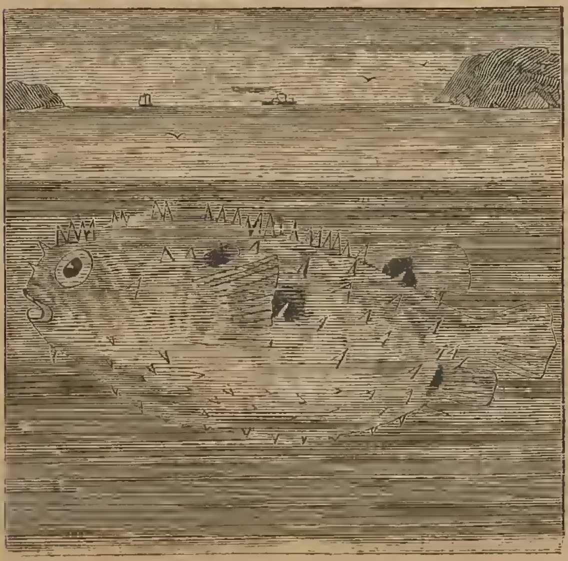
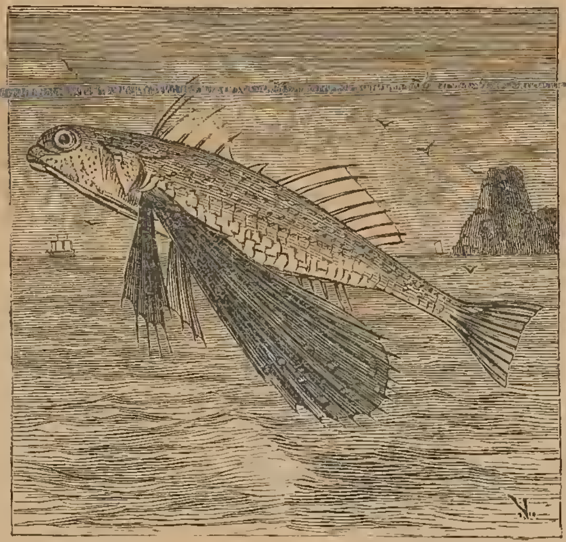
CURIOUS FISHES.

One of the most wonderful as well as interesting circumstances that we find in the great study of Nature, is the perfect adaptation of all animal life to place and circumstance, and investigations into their most perfect arrangements serve to show more plainly than words the wisdom of the great Architect. The man of letters or casual [illegible] both impressed when confronted with these living monuments of power that mind does exist in nature; and we, and all life, are but following the dictates of some vast power that we know not. This is the great object of the Aquarium. The wonderful animals of the sea that are found there are living *sermons* preached to the masses, and cannot fail to produce an effect that will give a new and fresh impetus to our great educational systems.



PORCUPINE FISH.

In many of the tanks fishes are seen of the most unique pattern, and why they are so, seems a hard question to answer; but every peculiarity has its purpose. Some are colored and framed to imitate the bottom, thus defending themselves, others are provided with inducements to coax the smaller *fry*, who, if they saw their huge *enemy*, could easily escape. Again, we find them provided with organs with which they procure food from the land without leaving their native element; and more wonderful than all we find them walking over the dry land as if to the manor born.

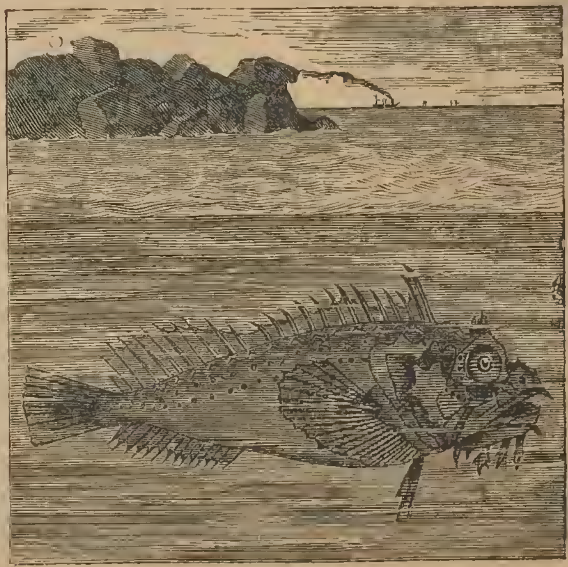


SEA SWALLOW.

One of the most interesting fishes in the small tank is the Porcupine Fish—a curious, oval-shaped little fellow, covered with sharp spines, and in fact a veritable swimming pin cushion. In the warm waters of the Gulf of Mexico they grow to a larger size, and present a remarkable analogy to their terrestrial namesake. The peculiar spines can be seen in the cut, and when taken from the water and puffed up with air it certainly can defy handling if nothing more. *Modesty* seems to be its prominent feature, as it hides away in the sea-weed at the top of the tank, and only descends when called to attend to gastronomic duties. They are easily tamed, and some years ago I possessed three of them, or rather knew where to find them daily, and taught them to swim through my fingers, and other tricks of simple nature.

The Sea Swallow, here illustrated, belongs to the peculiar family of Gurnards. The pectoral or side fins are developed to a wondrous length, and decked with bluish iridescent spots that flash and glisten in the sunlight like diamonds, as they skip over the cresting wave. The head is curiously encased in a bony armor, while the tail dwindles off, covered with soft, minute scales, in strange contrast to the former, and entirely defenceless. They are extremely hard to keep in confinement, and a continued supply is required, and at times hard to get.

The Sea Raven, here figured, and found in tank d, is another that claims the name of curious, and certainly deserves it, as the imagination fails to create a more marvelous and uncanny combination of flesh. Its resemblance to an old, moss-covered stone is striking, and herein lies its defence; as the fish that would devour it pass it by and the smaller fry that venture near, thinking the barbles of flesh sea weed, are in turn gobbled up. They occur in great variety on the New England coast, and vary in color from bright yellow to a deep red.



SEA RAVEN.

In due season numerous fishes will be added to the Aquarium that are never found in our waters, and among them the Plakat of Siam. This strange little creature is domesticated by the natives, and is a great favorite, being kept in jars and fed upon the larvæ of mosquitoes. They are made quite a source of revenue on account of their fighting propensities, which give an ample opportunity for a wager. When the fish is in a quiet state, with fins at rest, the dull colors present nothing remarkable, but if two are brought within sight of each other. or if one sees his image in a looking glass, the little creature becomes suddenly excited, the raised fins and whole body shine with metallic colors of dazzling beauty, while the projecting gill membrane, waving like a frill around its throat, adds something grotesque to the general appearance. In this state of irritation it makes repeated darts at its real or reflected antagonist. The Siamese are as infatuated with their combats as are the Malays with their cock fights, and stake large sums, and even their liberty and family upon the issue. The license to exhibit these fish fights is "favored" and yields a large revenue to the crown. The Bearded Drum Fish has probably caused more *noise* in the world than any of its associates. Queer, muffled, "boom"-like sounds are frequently heard rising from our northern waters, and upon placing the ear near the surface it appears to come from four or five different locations, so peculiar is the conducting power of the water. Now it will come softly and gradually increase, and eventually burst out in a loud "boom, boom." The originator of the queer sounds is the above-mentioned fish, and the supposition is that the strange sounds are produced in the fishes' efforts to beat off the parasites that infest it.

Another faithful satellite of Euterpe is personified in the noisy Maigre. It makes a strange cooing noise that can be heard at a depth of twenty-five feet. The name of Cyro is given to one genus of this fish by the Italians, from the *croaking* noise they produce. In Central America they are known as the Elroncador, from the same reason, and in the Mediterranean Sea the bell-like sounds are laid at its door, while others believe they are produced by a shell mollusca. On our shores the sounds are quite common, and people have been unable to sleep on board vessels, from the notes of this aquatic drummer. This fact is mentioned by Schoepff, in the Berlin transactions. Lieut. John White mentions, in the narrative of his voyage to China published in 1824, that when his ship was anchored in the mouth of the river Camboya, the crew were amazed at the strange sounds that arose from the water, resembling the bass of an organ, mingled with the tones of a bell, the croaking of an enormous frog, and the clang of an immense harp. The sounds swelled into a general chorus on both sides of the ship, and were attributed bv the interpreter to a "Scull" fish.

No wonder the people of olden time believed in the "silvery notes" of the mermaid. Baron Humboldt mentions a similar occurrence which he witnessed in the South Sea.

"About seven o'clock in the evening the sailors were terrified by an extraordinary noise in the air like the beating of tamborines, followed by sounds which seemed to come from the ship and resembled the escape of air from a boiling fluid." Such is this strange creature, and one is almost led to believe that a fish language awaits the "linguist of the future." I have often caught at Key West a fish called from its noisy proclivities the *Grunt*, and they evidently do credit to an old porker. I shall never forget the first one I captured; thinking my bait was *non est*, I pulled in and found to my astonishment a Grunt fairly hooked. He seemed to know that he was in a bad fix and intended making the best of it, as he made not the slightest jump—but no sooner had I laid him on the wharf than he commenced grunting and groaning in such a pathetic and mournful manner, that in a few moments he had completely won my sympathies and I tossed him back, and with a grunt and a splash he went on his way rejoicing.

Numerous of other forms could be mentioned showing the wondrous capacity of the great sea—that teems with life from huge forms down to the *mite* that is, born, reproduces millions, and dies in an hour in one drop of water.

C. F. HOLDER.

A FISH HUNT.

The *Geographical Magazine* gives the following interesting account of a Fish Hunt off the Færo Islands:

The most profitable fishery of the Færo Islanders is that kind of large dolphin, called by them *grind-hval* (*Delphinus globiceps*), and by the English "bottle nose." The Scotch, Dr. Brown tells us. call it the "*caaing whale*," *caa* signifying to drive, from the ordinary method of capture being by driving them on shore. The head of this cetacean is short, thick, and nearly globe-shaped. The body is long, of a black color on the back and sides, with the belly marked by a white line. The *Delphinus globiceps* habitually comes to the Færo Islands during the spring and autumn, generally when it is misty and drizzling, which kind of weather the Færo Islanders called *grindemorke* or *grindeveir*.

This fishery is a veritable blessing to the Islanders. Part of the blubber is salted for domestic use, but most of it is destined for the manufacture of oil. The flesh is eaten salted, well dried, or fresh. It is tougher than beef. The bladders are made into straps for the thole pins in the gunwales of boats, and many other parts of the animal are utilized. In their ordinary conversation the islanders call a single *Delphinus globiceps* a *hval* (whale), while a school of them is called *grind*.

When a boat of fishermen sights a *grind* on the open sea a sailor's jacket is hoisted at the mast-head. At this signal all the other boats in sight hasten to assemble near the *grind* and range round it, to prevent its escape before a large number of boats has come up, in order that the chase may be conducted with the necessary certainty and energy. Sometimes the *grind* is very wild, which makes the chase difficult. It occasionally happens that the fishers pursue the *grind* for several days, surrounding it many times, and yet, notwithstanding all their patience and toil, they are obliged to abandon it. It occurs, not unfrequently, that the *grind* is first sighted, blowing in the offing, from the top of a cliff. If this is on a part of the coast where the boats cannot be seen, the news is sent to the nearest village, messengers carry it from village to village, and long before they arrive their cries of "*Grindebo! Grindebo!*" arouse the whole population. Every man capable of handling an oar runs to the boats, some armed with knives and harpoons. The knife is long, with a large steel blade, and is suspended to the waist-belt in a leathern sheath. The harpoon consists of a blade of two edges, about three inches wide and twelve to fourteen long, with a handle eight or ten feet long, attached to a line in the boat. In a few moments the boats are ready to hurry to the chase. The are manned by ten oarsmen and a coxswain.

Admiral Irminger describes one of these *grind* hunts in which he himself took part. It was in 1844 that he found himself at the village of Midvaag, in the Island of Vaagoe. At five in the morning of the 29th of June he was aroused by the cries of "*Grindebo! Grindebo!*" It was a perfect *grind* day, that is to say with a cloudy and misty sky. The *grind* had been seen at three in the morning by a fishing boat about twelve miles south of Vaagoe. An extraordinary commotion agitated the village. The boats were ready almost in a moment, and soon after they were out of sight. The village of Midvaag was selected, with reference to the direction of the wind, as the point at which the *drub* (killing), as the Færo Islanders call it, should take place. Midvaag is situated on a coast which rises gradually from the sea, and at the bottom of a bay in which, when the *grind* has been hunted, the boats can easily surround and harpoon them. Part of the population staid on shore, and assembled at a spot where they could have a clear view over the sea.

At first a drizzling mist obscured the view, but towards 9 A. M. the sky cleared, and there was no sign of the *grind*. The general opinion was that it would not be reached before noon. The tide did not turn before 11, and the chase ought not to be begun until the current is in its favor. Towards 11 A. M., to the great joy of the eager throng of spectators, three boats came in sight, and soon afterwards fourteen were counted, but it could not be made out whether they were actually chasing the *grind*. They appeared, however, to be ranged in a semi-circle, and consequently occupied in the chase, and a moment afterwards a line of foam was discovered in front of the boats, which resembled the meeting of two tides. It was the *grind*. The rapidity of their movements, and the constant blowing of these cetaceans, caused the line of foam.

The boats had begun to assemble near the *grind* soon after dawn, and it was decided that Midvaag would be the most convenient place to make for. It was necessary to surround the *grind* while the tide was ebbing. With the turn of the tide the chase commenced. The boats were ranged in a semi-circle, propelled by oars, and steered in accordance with the directions of the harpooners. The animals, to avoid the boats, keep in front. As the water shallows, all possible precautions are taken to prevent their escape to the open sea.

Soon after noon the entire *grind*, followed by 71 boats, manned by 670 seamen, entered the Bay of Midvaag, which is surrounded by high mountains. First came the cetaceans, followed by the boats, and all [illegible] which had hoisted the jacket as signal. Pursued and pursuers flew over the sea with the rapidity of an arrow, the sailors pulling at their oars as if their lives depended on the result.

Notwithstanding the fine weather the sea was violently agitated, not by the wind, but by the rapid movements of the terrified animals, and their blowing caused a deafening noise. The excitement was intense. As soon as the *grind* was about 400 yards from the bottom of the bay, the harpooners in the bows of the foremost boats began to lance their harpoons. Soon the foaming waters were reddened with blood. The slaughter soon became general, the harpoons flew about on all sides. Here a wounded animal sprang furiously into the air, the troubled waters crimson with its blood. There a whole troop rushed blindly against the boats. In two and a half hours after they entered the bay, two hundred and forty-nine cetaceans were dead upon the beach, the largest being twenty feet long. A day or two after the hunt the dead bodies of some of the victims appear on the surface of the sea, being those that had been killed in deep water. These are called *driv-hvaler* or floating whales.

The slaughter over, the boats return and the men rest from their fatiguing work. Many have pulled thirty-two miles from the place where they received news of the discovery of the *grind*, showing not only the rapidity with which the news spread, but also the energy of these brave people. Five hours after noon the ebb commenced, and the carcases were left high and dry. Then the division was made according to established rules. The largest share belongs to the boat that hoisted the signal, and the head and the fattest part of the animal are the recompense of the man who first sighted the *grind*. The division finished, the boats return each to its own village, well laden with flesh and blubber. The flesh is cut into long strips, and hung up to dry; and having separated the blubber destined for domestic use, the rest is boiled. A barrel of oil is obtained from each animal.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

Well, my young friends, what do you think of your Uncle Octopus, now that you have his picture? He is not such a bad looking fellow, after all; and, if he looks a little awkward, remember he is out of water, and "a fish out of water" is always a queer looking thing. Besides, those spectacles are only put on when he is out in the sun, and just before he goes into the water he takes them off, rubs them on his sleeve, and sticks them in his inkstand along with his quill pen. I wonder if he got the quill for this pen from some stray goose? If so, then *we* must not come too near, for fear he might need another.

But your Uncle had almost forgotten what he wanted to say. He proposes to offer a prize, and this is it. He wants a composition about *Whales*, to publish in the AQUARIUM JOURNAL. It must not be longer than four hundred words nor shorter than two hundred. It must be written by one of his little nephews or nieces—you are all his nephews and nieces, you know—who is not over ten years old, and it must be thought of and written "all yourself."

Now, just try to write one, and send it directed to the editor of the AQUARIUM JOURNAL, corner of 35th street and Broadway.

The prizes will be as follows: For the best composition about Whales, the writer shall have a beautiful little fish globe with gold and other fish and some little pebbles in it, and perhaps a plant or two. The next best story of the Whale shall be rewarded by a book with pictures, telling of "Life Under the Ocean Wave." Now try, all of you, what you can do, and we will print the best story in this JOURNAL; and if there should be two best, then there must be two fish globes, which will be all the better for you, but all the worse for your UNCLE OCTOPUS.

A DEVOTED PAPA.

That virtue does not depend upon size is plainly illustrated by a funny little fellow that lives in the sea known as the "Hippo-campus." He is more commonly called the Sea-horse, and you little folks who read this need not trouble yourself about the long scientific name until you become familiar with his form and habits. Large sounding names without practical knowledge amount to nothing, but bless me how much of it there is now-a-days. If you have ever seen any of the painful dried up remains of sea-horses in the museums, forget all about them and go to the Aquarium and get acquainted with the little creatures there, see how they "stand up when they sit down," watch them take a hearty meal of Serpula, and laugh as loudly as you can when they clutch each other's tails and hold on for dear life. And if one should come to the front of the tank and look you full in the face, I beg of you to examine his queer little eyes looking in opposite directions. He will appear to gaze at you intently with one eye and have the other fixed on something in the water without the least confusion of vision. The Sea-horse is only three or four inches long, with head shaped much like that of the common horse, and the two fins which project from the sides of the neck likewise increase the resemblance.

SEA HORSES AT THE AQUARIUM.

The general color is ashen gray, with almost indiscernible spots of blue, and in certain lights various hues play over the body. Its peculiar corrugated appearance, together with the silvery, metallic spangles with which it is studded, remind one of the tiniest of knight-errants clad in a suit of mail. The dorsal fin fringed and bordered with yellow, is delicate and beautiful, and the prehensile tail with which the owner attaches itself to a fixed object, is used most comically there, I can tell you. The Sea-horse is not a great swimmer, but is seen oftener pert and erect with tail attached to sea-weed than in any other position.

Unnatural as it may seem, Mrs. Sea-horse does not have the least interest in or care of her young. The father takes the whole care of the family, and feeds them, how do you suppose? Nature from the first seemed to have been aware of Mrs. Sea-horse's lack of maternal feeling, and in the emergency, provided her husband with a pouch. Into this she coolly deposited her eggs, and her sex have shirked the duties of a mother ever since.

The papa not only protects the eggs but hatches them out in his pouch, and allows the mites of Sea-horses to feed upon the fat lining which it contains.

Devoted as he is, however, the time comes when he thinks his children are able to provide for themselves, and without the least ceremony he fastens his tail to the lower part of a rock, or shell, and by pressing his pouch against the side forces the little ones out to make their debut. Their bewildered appearance in the water is most ridiculous, but after a time they conclude to make the best of circumstances and clasp each other confidently by the tail and swim about in a mass. The parent does not desert them at once, but keeps near them, and if one gets away from the rest he swims after it, takes it in his mouth and returns it to the brothers and sisters.

IDA B. ROBERTS.

Now, my young friends, remember that all these stories about fish are true, and when you read them you must not forget what they tell, but should rather try to find out more about these wonderful creatures that live in the sea. The best work that any of us do in the world is that which is undertaken willingly, and so it may be that reading these strange stories will make you glad to study or listen to what your teachers have to tell. It is not so hard work to be wise, after all; little by little we find our minds growing, just as our bodies grow when we have good food, and these truths about nature are the best of food for even your young minds; and there is no danger of our knowing too much.

That story about the Sea-horse is a good one; at least your Uncle Octopus thinks so, and what is better it is all true. Now if you want to make it better still then don't fail to come to the Aquarium and see the beautiful live Sea-horses. You can find them in the tank marked 1, and when you see them you will know them by their likeness to the ones in the picture. In the same tank with the Sea-horses you will also see that queer little balloon fish that we talked about in the last number, and which Mr. Holder has written about in the first page of this journal. Please remember that though this is the page written for you alone, yet our young friends will be made wiser if they read all they can; and there are so many wonderful things in the world that we must begin soon to learn about them if we are ever going to know.

W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM JOURNAL.
W. S. WARD, Editor.

NEW YORK, NOVEMBER 8, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

OUR EDUCATIONAL DEPARTMENT.

We have postponed until the present issue of *The Journal* any extended reference to the free scientific and educational department of the New York Aquarium, in order that our readers might be first informed regarding the Aquarium proper. Taking it for granted that the public are at last familiar with the main pavilion, and have begun to make the acquaintance of the creatures there displayed, we take a peculiar pleasure in directing their attention to this novel and important adjunct. In the early stages of the movement the Manager, Mr. COUP, put himself in communication with Mr. WARD—now a member of his working staff—who had been active in urging upon our countryman the need of such an institution. The result of that conference was the establishment of this free Scientific and Educational Department. The architect was instructed to so make his plans that they should include suitable apartments to be used as a library, reading-room, and naturalist's laboratory. In the equipment of these several rooms no expense was spared. The library, which occupies a most commanding place, was furnished with a collection of valuable books on Natural History, a full list of scientific periodicals, and fitted with a speaker's platform for the benefit of lecturers and teachers. This library is open and free to the use of all who desire to avail themselves of the privileges there offered. While it is naturally expected that those who desire to study and read the works here placed at their command will also find that in the Aquarium to engage their attention, yet the library is separate from the main pavilion, approached by a special entrance, and hence in every sense is *free.*

Not only are those interested in science—especially Natural History—welcome to these apartments, but the rooms are also at the command of any organized scientific body which may desire them for regular or special meetings, and will be granted for this purpose free of charge.

Adjoining the library is a large room designed for a laboratory and naturalist's workshop. Here are tables for dissecting purposes; experimental tanks for special observations, and all the needed appliances for the securing of plaster casts. These too, let it be clearly understood, are placed at the disposal of all students who may desire to use them, and no charge is made or any compensation of whatever nature expected. If the question should arise as to the motive which prompted this generous recognition of the claims of science, we answer decidedly and with authority, that it was determined to make the Aquarium a positive agent for profit to the people, and that the desire to effect this prompted so generous an allotment of space and appropriation of money.

Any reader, who has also been a visitor at the Aquarium, need not be told that the institution is a legitimate enterprise, dependent for its success upon just and worthy claims; although hardly a month old the tanks are yet the most attractive and interesting of any in the world, and it will be evident, also, that the interest which the study of these wonders is likely to excite will be greatly enhanced by an increased knowledge as to their structure and habits. It is for the purpose of extending this knowledge that the Scientific Department was founded.

The management of this special department, as well as the editorial direction of this Journal, has been placed in the hands of one who is familiar with the needs of students, and in thorough sympathy with the manager in his desire to serve, not only the patrons of the Aquarium, but all those who desire to extend their acquaintance with Nature by the study of her works. In choosing thus to give editorial endorsement to those special efforts, it is done that the public may be specially and authoritatively informed regarding the high and sole purpose of the Aquarium free library, reading-room and laboratory; and in extending a cordial invitation to all students to avail themselves of the privileges here accorded them, it is in the confident hope that their presence will add to the credit and worth of the Aquarium, and what is still better will advance the cause of true science in one of its most important departments.

SCIENCE AT THE AQUARIUM.

The evening of October 30th was one of unusual interest at the Aquarium. At that time there was assembled in the library and reading room, that distinguished body of savants, the New York Academy of Sciences. In response to a request from the manager of the Aquarium, the members of The Academy met to listen to two papers, the one by the Chairman, Prof. E. C. H. Day, of the Biological Section, the other by Mr. Fred. Mather. The subject of Professor Day's remarks was "Thoughts on Evolution;" and the speaker left no one in doubt as to his devoted adherence to the theory which has for some time past engaged the attention of many students of science. Professor Day's address was followed, and in an informal manner reviewed, by Professor Newberry, President of the Academy, who was in turn equally emphatic in his opposition to certain of the so-called scientific deductions made by Darwin and his followers. At the close of Professor Newberry's remarks, Mr. Mather read an interesting and instructive paper relating to Fish Culture, its history and the result of his efforts at the Aquarium, from which communication we quote somewhat at length, as follows:

MR. MATHER'S ADDRESS.

The Chinese are credited with having practiced Fish culture for centuries, and it was the fashion a few years ago to claim great superiority for them in the art, for the reason that they had practiced it so long a time.

This comes from travelers, who, noticing fish culture for the first time in a foreign land, and knowing nothing of what had been done in this direction in their own country, brought exaggerated reports of the proficiency of the Celestials, which later investigations seem to prove without much foundation.

Naturally wishing to know in what they excelled, I made inquiries as to their modes, and found that all they ever did was to place bundles of fagots or straw where the carp and kindred fish whose spawn was glutinous, would deposit their eggs, and when full would raise them from the water and transport them a short distance to other waters. This, and an absurd story about placing the ova in the shell of a hen's egg and hatching it under a hen, is all that I have been able to learn of the boasted superiority of the Chinese. It is, moreover, demonstrated that no country on the globe has made such progress in fish culture as America, nor are there any fish culturists that understand their business better.

A proof of this is now to be seen in this Aquarium. Here are eggs of the salmon, taken by Mr. Stone, of the United States Fish Commission, in the mountains of California, packed in moss in such a perfect manner as to bear three days' jolting over rough mountain roads to Sacramento, whence they were sent by express to New York, and a more perfect and healthy lot of eggs it has rarely been my good fortune to see. As you will observe, they are nearly all hatched, and are strong and lively.

Some years ago I packed the eggs of the brook trout and sent them safely to England.

That art has improved upon nature in hatching fish, is easily seen by a comparison of the methods of both. We will take, for instance, the trout. In nature the fish pair off and seek a gravel bed in a spring stream, where they occupy several days in making a suitable nest. This is done by the female, who whips it clean with her tail, and, when free from sediment and of a proper depth, presses her abdomen in the cavity and thus emits her eggs. The male, who all this time has been at her side, immediately discharges his milt, and the eggs are covered with gravel and left to their fate. As this occurs in water from six inches to two feet in depth, there are many eggs that are not reached by the milt, and consequently remain unpregnated. Then, as it requires from fifty to eighty days, according to the temperature, to hatch them, they are subjected to all sorts of mishaps; another pair of fish may choose the same spot and whip them all out to be devoured by the smaller fish; a freshet may cover them with mud and smother them; ducks, eels, and cray fish will dig them out, or a few dead ones may develop a fungoid growth that will envelop them all in the mantle of death. And even when hatched, the young fish is so weighted down by its great umbilicus that it cannot swim, and, as it emerges from its prison house, is liable to be devoured on the instant.

It would seem that nature has provided for all this great waste of life by supplying to the fish a great number of eggs, so that if one in a hundred reaches maturity, the stock is kept up. It is the same with the seeds of plants, for when wild but few grow; and it is only when man steps in and tills the ground and sows the seed in the proper manner, that a full crop is obtained. The fish culturist, by taking his milt in a pan first, and then gently stripping the gravid fish into it, thus bringing every egg in contact with it, secures a fecundation of about ninety per cent. He then protects them from the sun, sediment and all other enemies until hatched and the umbilical vesicle absorbed.

They are not put out until ready to take food and care for themselves. After this there is a chance for some to be devoured, but the critical period is passed, and thousands have been successfully carried to the self-sustaining point, at which only a dozen or less would have arrived if left to nature.

We find that the eggs of fish belonging to different families require different treatment. Thus, while those of the salmonidæ are hatched as you see, lying on screens, the eggs of the shad require to be suspended in moving water, and will die if left on the bottom.

There are three characters of fish ova. First, that of the yellow perch has its eggs in a long mass, which is hung over twigs in the water, and looks like a string of lace with bright, jelly-like dots in it. Second, the other percoids, cyprinoids, &c., have the eggs separated, but each enveloped in a glutinous substance that adheres to the stones and sticks with which they come in contact. These are the most difficult eggs to handle that the fish culturist meets, on account of their tendency to mat together in the pan, and thus smother those inside. This can be partly obviated by using bundles of twigs or straw. Third, the salmon, shad, trout, grayling, &c., have eggs separate and non-adhesive.

There are some percoids who have non-adhesive spawn. as the striped bass or rock fish, the sea bass and others.

The eggs of the fresh water black bass are of those where nature left to herself does the best, for this fish guards the nest and keeps away all intruders, as well as keeps the eggs clean and the water on them in circulation by fanning them with her tail; and here all that can be done is to collect the young for transportation, or to stock waters with the adult fish.

Mr. Mather then called the attention of his distinguished hearers to several specimens of the eggs of the California salmon and the fry, which are now being hatched in great numbers in the troughs of the Aquarium. An object of special interest was a very queer double fish or twin salmon, where two fry were joined to one yolk like the Siamese twins. Owing to the position which the bodies of these two specimens have to lie, the beating of both hearts and the circulation of the blood was plainly visible. These interesting objects are still alive, and may be seen in a glass near the hatching tanks.

At the close of Mr. Mather's paper Mr. W. C. Coup, the manager of the Aquarium, extended an invitation to the society to visit the main pavilion, which he had ordered to be kept open beyond the usual hour, in order that the members might have abundant opportunity to inspect the work.

A MERRY EVENING.

The evening of the 31st of October was one that will long be remembered by the friends of the Aquarium, and a brief record of the event which bears with it so pleasing a reminiscence will, we are confident, be of interest to eur readers.

The following transcript of a Card of Invitation will explain the purpose of the social re-union to which we refer:

To Messrs. W. C. COUP and CHAS. REICHE.

Gentlemen—The undersigned, acting as a Committee, and others, respectfully solicit your acceptance of an invitation to a Social Entertainment, to be given on the Evening of Tuesday ensuing, Oct. 31st, at "Parker's." We are prompted to propose this trifling compliment from a desire to evince our sincere appreciation of your enterprise and liberality in carrying forward to a successful and brilliant culmination, in defiance of obstacles sufficiently serious to deter the most sanguine, the grand project of giving to the chief American metropolis an extensive, costly and beautiful Aquarium. Co-laborers with yourselves in the progress of the work, we have had our admiration aroused by witnessing from the inception of the enterprise to the final completion difficulties of the utmost gravity vanquished, and every personal discouragement (and they have been many) subordinated to the one great sentiment of ultimate success. Your determination, perseverance, energy, rare executive ability and admirable temerity, under the most trying circumstances and in the face of most unlooked for mishaps, are beyond all praise, and none can, or do understand the nature of the almost insurmountable obstacles which you have one by one overcome, better than ourselves.

We trust we may be permitted to take advantage of the present opportunity, also, to give expression to our heartfelt congratulations upon the signal success attending your efforts to afford still another ornament to our city, and to provide an establishment which should be perpetual in its establishment, wide-spread in its usefulness and never-ceasing in its pleasurable and instructive features. We remain, respectfully,

R. J. EDGAR,
W. S. WARD,
FRED. MATHER,
JOHN W. HAMILTON,
W. H. BROWNING,
ANDREW SMITH,
Committee.

In response to this request a company of thirty gentlemen sat down to a richly laden feast, which was followed by a series of toasts and responses that were even more rare and racy than the repast which preceded them.

"Our Guests" were, of course, the first to be honored, and in their responses Messrs. Coup and Reiche told the story of their struggle, which, in the light of their final triumph, was all the more welcome.

After thus recognizing the claims of our guests, the services of the associate laborers in the enterprise were recognized by toasts and responses, as follows:

The Aquarium	Fred. Mather
The Architect	A. D. Ogden
Business Management	R. J. Edgar
Contractors	A. Smith, W. H. Browning, &c.
The Press	Mr. Williams of the *Herald* Mr. Pulham of the *Times*
Art	F. T. Vance
Music	H. B. Dodworth
Science	W. S. Ward
The Ladies	J. W. Hamilton

A noteworthy feature of these responses was the recognition of the constant watchfulness and valuable direction given by Mr. Coup, who, as manager of the enterprise, seemed fully able to direct all his associates in whatever branch of the service they were engaged. Following the more formal proceedings, were the numberless interchanges of compliments and congratulations, the intervals being taken up by the band, which, under the direction of Mr. Dodworth, added to the harmony and cheer of the hour.

WHAT OUR FRIENDS THINK OF US.

The New York Aquarium is now a pronounced and complete success. After almost insurmountable obstacles and difficulties, accidents and mishaps, the proprietors, Messrs. Coup and Reiche, are to be congratulated upon bringing to a successful result this novel experiment. Few would have the pluck and hardihood to encounter so great and expensive an undertaking, and still fewer would have overcome so completely, as the above-named gentlemen have done, the many difficulties which beset them.—*The Sportsman.*

The only place comparable with the Aquarium is the Centennial Exposition in Philadelphia, for it can be truly said of both, that at each visit, no matter how frequent, new wonders and charms are discovered.—*Noah's Times, New York.*

Fish are now on their way to the Aquarium from all parts of the globe, and fresh arrivals occur daily, so that no matter how often you may visit the place, you are always sure of seeing something new.—*Brooklyn Sunday Sun.*

The peculiar venture of Messrs. Coup and Reiche is still in course of improvement, and is beginning to prove that the New York public is willing to pay for novelties in whatever shape they may come.—*N. Y. Herald.*

Mr. W. C. Coup, in organizing and opening to the public such an establishment as the Aquarium, has rendered a signal service, and one that we earnestly hope to see substantially recognized.—*N. Y. Dispatch.*

Already this Aquarium attracts a continuous stream of visitors day and evening, and it is destined, we do not doubt, to prove a most brilliant and lasting success.—*Rochester Union and Advertiser.*

As a place of recreation and instruction it has no superior.

Behold in this what leisure hours demand—
Amusement and true knowledge hand in hand.
—*Brooklyn Eagle.*

The Aquarium continues to attract daily large and fashionable assemblages, and has evidently taken a decided hold upon the public favor.—*N. Y. Journal of Commerce.*

No one should miss the opportunity of seeing the Aquarium as now opened. Nothing that is beautiful, artistic and useful in its appointments, is omitted.—*New York Tribune.*

The Aquarium has become a centre of singular study and interest.—*N. Y. Daily News.*

The Aquarium is now the delight of the children.—*N. Y. Evening Mail.*

FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Only two troughs are in use at present and are filled with the ova of the California Salmon which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalist's the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years, but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, accordingto the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Later in the season the other troughs will be occupied by the Land-locked Salmon from Maine, a fresh water variety, the Lake Trout, the Brook Trout and the Whitefish; these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it a useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.

COD.—Gadus Morrhua.

Every one is familiar with this fish from the number almost always present in the fish-shops and markets. Lying on a slab with huge head, gulf-like mouth, with pendant barb and dull staring eyes, it is by no means a lovely object. Judging it by its appearance in death, one would suppose it a mere stupid mass of animated matter, whose only purpose in creation was to eat incessantly, and be eaten when gorged enough. But the Cod, on the contrary, is a most intelligent fish, capable of friendship with its guardians and feeders.

In Mr. Buckland's work, "Familiar History of British Fishes," page 126, published by the Society for the Promotion of Christian Knowledge, 77 Great Queen Street, Lincoln's Inn Fields, is a description of the tame Codfish at Port Logan, Scotland. These fish are kept in a pond cut out of the solid rock, the entrance and exit of the salt water being guarded by an iron grating. The fish are kept here, and taken when required for the home use of the proprietor, General McDonald, late 2d Life Guards.

Very remarkable substances have been at times found in the stomachs of Cod—for instance, a large piece of ship's tallow candle, a bunch of keys, a guillemot, feathers and all, and whitings to the extent of eight pounds at a time.

Records are also known of the large size of the Cod. One was taken at Port Knocke which weighed 60 pounds. This fish had no melt or roe, and no food in the intestines. The length was four and a-half feet, and three feet round the thickest part. The head was one and a-half feet in length, and weighed 15 pounds. This was undoubtedly the largest Codfish ever taken in British waters. Cod's food consists of shellfish, crabs, and worms; but, as it is perpetually hungry, it will devour smaller fish, as herrings, sprats, lampreys. It is caught with a hook and line baited with some of the above mentioned fish, and such is the enormous quantity taken, that the celebrated fishing ground called the Banks of Newfoundland, gives employment to a fleet of boats, whose gross earnings amount towards one million dollars. Its liver contains a valuable oil, greatly used in cases of debility. Cod are very prolific; a Cod's roe weighing seven and three-quarter pounds will contain nearly 7,000,000 eggs. These are deposited on the surface of the water, as has been proved in the Brighton Aquarium. In about sixteen days the young fish are developed, though the open sea is a very insecure place for baby-fish; a multitude must survive to furnish the perennial supply our fishermen bring to shore. Codfish can be kept alive a long time. At Fulton Market they are placed in perforated boxes and moored in the docks.

THE SEA SWALLOW.

Dactylopterus volitans.

In tank c we find this bird-like member of the finny tribe. Upon examination the head appears to be encased in a bony armor, while the remainder of the body is covered with minute scales, that form a strange contrast to the former. It, however, needs but little defense, as the pectoral, or side fins are developed to a wonderful extent, rendering it able to rise from the sea and skim over the surface after the fashion of its terrestrial namesake. With such force do they move, that they have boarded a vessel and striking a sailor upon the forehead, fairly knocking him down. They belong to the curious family of Gurnards, and strange tales are told of *sounds* that they produce under water, but the question is still open to the speculations of physiologists. Prof. Baird was fortunate in witnessing this phenomenon, and expressed an opinion that it originated in the belly of the fish. Dr. Davy discovered flat, grinding teeth in the œsophagus of the *Red Gurnard*, and it is probably by a peculiar movement of these that the *strange language?* is produced. In appearance, the Swallow is very attractive, especially in the sun light, when the beautiful bluish iridescent colors of the "wings," and the flesh colored ventral fins come out in bold relief and mark it as one of the most attractive of its kind. It is found occasionally in New York, and has a wide geographical range. It feeds upon the small cruestacea that the sea *affords*.

THE SEA RAVEN.

Hemitripterus Americanns.

Closely connected by family ties to the Sea Swallow, is the Sea Raven, several fine specimens of may be seen in table tank d, and it is always surrounded by *doubtful* admirers who speculate as to the *ownership* of the wonderful tufts, "bobs," and masses of disjointed flesh that seem to cover it, and the visitor is not rarely led to believe that by a system of inactivity it has been covered with a growth of aquatic plants and verdure. But they are all "real," and this fantastic ornamentation is the bona fide work of nature. The specimens in this tank were captured near *Gay's Head*, Mass., and are there known as *Sculpins*, and make sad work with the lines of the patient fisherman. It is subject to great variation of color, and the Aquarium will soon possess specimens, varying from the rich, russet brown to a bright *carmine* yellow and red. They feed entirely upon small fish, but do not reject any morsel that their capacious mouths can cover.

THE BANDED PROTEUS.

Memobranchus Lateralis.

The Banded Proteus now to be seen in table tank w of the fresh water series, is one of the most curious and interesting of aquatic animals. As the visitor to the Aquarium will be able to observe its peculiarities of form and structure, no extended description of them is needed. It will be well, however, to direct attention to the peculiar form of the gills, there being three on each side, ramified and fringed, and of a red color, on account of the blood which circulates through them. Dr. Beall invented an ingenious arrangement by which this phenomenon of circulation could be witnessed. The blood dics are of so extraordinary a size that they can be distinguished by an ordinary pocket magnifier while passing through the vessels.

The Banded Proteus is found in Lake Champlain and at the outlet of Lake George. It is also to be found in certain of our Northern lakes, where its presence is a bane to the fishermen, since it has a peculiar fondness for the spawns of the white fish. Its movements in the water are usually slow, but, from the size of its tail, it is evident that when occasion demands it can move with great speed. They are said occasionally to come upon the land. Its color is brownish with blackish spots, and its length varies from one to two feet.

Wood, writing of the *proteus anguinus*, says that the discovery of this animal is extremely valuable, not only as an aid to the science of comparative anatomy, but as affording another instance of the strange and wondrous forms of animal life which still survive in hidden and unvisited nooks of the earth. The specimens now at the Aquarium are displayed to the best advantage, and the visitor can but regard them with curious interest.

THE ALLEGHANY HELL-BENDER.

Menopoma Alleghaniensis.

The interest which attaches itself to the series of fresh water tanks at the Aquarium is mainly divided at present between the Proteus described above and the subject of the present sketch. As its name indicates, the Hell-bender is found in the Alleghany river and other tributaries of the Ohio. It is also known as the Salamander of the Alleghanies. The specimens shown in tank r were presented to the Aquarium by the Buffalo Society of Natural Sciences, through its Secretary, Mr. A. R. Grote, who also read an interesting paper on the subject before the American Academy at its last meeting. This gentleman also records, in the *American Journal of Science*, the interesting fact that this animal sheds a transparent membrane, which he believes to be the exterior layer of the skin. While observing one in the Aquarium of the Buffalo Society of Natural Sciences, an almost complete skin, all the feet and toes being readily perceived, was seen floating in the water, and later the creature was discovered in the act of swallowing his former covering, a practice which has also been observed in the toad. The visitor who watches the menopoma, will observe a swaying motion of the body; this action is not yet fully accounted for, though it is possible that it is connected with the animal's desire to rid himself of his ugly skin.

A female Hell-bender opened on the 21st of August contained well developed eggs attached by a membrane to the oviary. These eggs are laid in a connected string, and are deposited along the muddy banks of the river. At this time there is a change in the external appearance of the creature. The tail broadens, and there is a plaited extension of the skin along the sides of the body.

The two specimens of Hell-benders now on view are worthy of special study, and, as in many other cases. we would advise those interested to view them as soon as possible, as already the confinement of the Aquarium has resulted in the death of one rare creature of this class.

HERMIT CRABS.

Scattered at intervals on the shingle bottomed tank(j) or in closely collected groups, will be seen numbers of those quaint Crustacea, remarkable for their habit of approaching the deserted shells of other animals, for the better protection of their otherwise tender and defenceless hinder quarters. This foregoing peculiarity has won for them the popular title of Hermit Crabs, although on account of their extremely irritable and pugilistic disposition, they are about equally well known as Soldier Crabs. The Hermit Crab (*Pagurus bernhardus*), is most frequently found, when young, inhabiting the cast-off shell of the Dogwinkle (*Purpura lapillus*), and at a more advanced condition of growth than that of the Common Whelk (*Buccinum undatum*). The process by which the Hermit Crabs have gained possession of these highly ornament villa residences, in place of their former sybaritic hut, is an artificial one, each individual having been originally extracted from an ordinary Whelk shell, and left in company with others of a foreign type from which it almost immediately made a selection. On the shores of tropical seas, Hermit Crabs normally inhabit these brilliantly-colored and fantastic-shaped abodes, including also the beautifully-spotted and naturally highly-polished Cowries; in this latter instance, the species of Hermit has a specially flattened body and general contour to enable it to utilize these remarkably narrow-apertured shells as a suitable protection.

LOBSTER.

Homarus Americanus.

The Common Lobster is a well-known member of the Crustacea. Its color is blue-black, flecked and clouded in a most elegant manner, but after boiling, it becomes of an almost uniform red. Its structure follows that of the *genus*, which has been treated generally. Its claws are powerful weapons, and are remarkable for being dissimilar. One is larger than the other, and one is furnished with saw-like elevations, the other is marked by rounded knobs. The wounds produced by the saw-shaped claw are very painful and difficult of healing. The Lobster is extremely nimble, and darts with a propulsion of the tail upon its prey, or evades pursuit with a surprising celerity. If endangered by an enemy, it penetrates into crevices in the rocks much smaller than its apparent bulk. It is very combative with its own species, and after a fierce encounter, the conquered frequently retires minus one or more limbs. But as these grow again, the damage is not of a mortal kind. It is very voracious, and this aids greatly in its capture, for it cannot resist the bait which is laid for it. The traps are made of basket work or pots, and the numbers caught are enormous. It is found on our northern coasts, even to the extreme north, and grows under favoring condition to a great size, some having been taken sixteen pounds in weight. It is most prolific, as may be observed from the mass of dark spawn often found clustered under the abdomen. If

COMMON STICKLEBACK.

Gasterosteus Pungitius.

This well-known fish is found in ponds, streams, and rivers, and appears equally suited to salt water. It is extremely voracious. An observer, once standing by the side of an ornamental lake, saw a young frog hopping past. He threw it in a short distance to exhibit its powers of swimming to a young bather, anxious to learn the art. The momeint it reached the surface of the water, a flash of light seemed to be emitted from the bottom. It was caused by a shoal of Sticklebacks, which pounced upon the unfortunate frog with great fierceness. In a few moments the four legs of the poor creature were eaten away, and new shoals came hurrying from more distant parts of the lake to the prey. The battle that took place round the victim was as desperate as could be imagined. Though pelted at with bits of gravel, they would not leave it, but continued to nibble and battle among themselves as long as a particle remained. This instance of voracity is, however, not surprising, for they do not hesitate to devour one another. An illustrated description of the Stickleback appeared in the first number of the Aquairum Journal.

THE SKATE, or CLEAR NOSED RAY.

Raia diaphanes.

Among the inhabitants of the *deep sea* tank, C, we find the Skate or Fluke, known as the "Clear Nosed Ray." Although extremely common upon our coast, they form an interesting object of attention from a peculiar habit of pressing their anterior side against the glass, showing a pure white surface, while the mouth and gill openings form a strong likeness to a flat, old fashioned human face, and tends to create no little amusement at times among its auditors. At times they cover themselves with sand, and only the gentle movement of the gills tells of the life within, In the same tank are the peculiar eggs of this fish, called by some "Sea Barrows," from the four appendages that spring from the four corners, and unconsciously seize the grass and algae, thus holding the young skate in position. They feed upon young crustucea, and are consequently unfit for use, the flesh being usipid and gelatenious.

GAR FISH.

Lepidosteus Osseus Liu.

One of the most interesting fish in the large fresh water tank, is the Bony Gar Pike, and here we find a living representative of the old *Ganoid race* that are now only known by their impressions in the hardened sandstones that tell of seas that rose and fell, perhaps millions of years ago. The fish is completely encased in a coat of smooth, thick, and rhomboidal *scales*, an armor equal to any foe. They grow to a large size, often exceeding four feet, and with their long bill armed with needle like teeth, and powerful fins form no mean antagonist to the fisherman or sportsman. They are quite common in Lake Erie, where they are known as the Buffalo fish, a species, probably the same has been found in Lake Champlain. They are fed in the Aquarium upon small *Dace*, and their quick movements in securing their prey render them specially worthy of notice at the time of feeding.

THE AQUARIUM GUIDE.

The following tabulated list is designed, with the assistance of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER SERIES.

Tank A—Whale.

Tank B—Seals.

Tank C—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Prickly Skate, Summer Skate, Sand Shark, Smooth Dog Fish, Ling, Lobster,* Sea Bass, Black Fish or Tautog.

Tank E—Striped Bass, Weak Fish.

Tank F—Five varieties of Star Fish.

Tank G—Star Fish, five varieties of Sea Anemones.

FRESH WATER SERIES.

Tank H—Common Cat Fish, Blue Cat Fish, Yellow Perch, Fresh Water Dog Fish, Common pond fish.

Tank I—Yellow Perch, Algal (Brook Pickerel), Shiner, Blue Cat-fish.

Tank J—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank K—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike,* Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Water Sheepshead.

SALT WATER SERIES.

Tank L—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank M—Lafayette Fish, Flounder, Blue fish, Young Skate, Black fish.

Tank N—Blue fish, Blackfish, Eel, Striped Bass, Manhaden, Lafayette, King Crab.

Tank O—Killi-fish.

Tank P—Lobster, Lady-crab; Edible Crab, Spider Crab, Hermit Crab,* Spotted Crab, Lobster.*

Tank Q—Lings.

Tank R—Rock Cod.

Tank S—Black Sea Bass.

Tank T—Lobster.

SALT WATER TABLE TANKS.

Tank a—Tidal tank.

Tank b—Porgies, Pecten.

Tank c—Striped Gurnards, Barred Killi-fish, Algae, etc.

Tank d—Sea Raven,* Bermuda Lobsters, Lady Crabs, Spider Crabs, Rock Crabs, Winter Flounder, Pectens, Sheepshead Lebias, Algae.

Tank e—Wharf fish, or Cheesey Black fish, Spider Crab, Pectens, Lelbias, Algae.

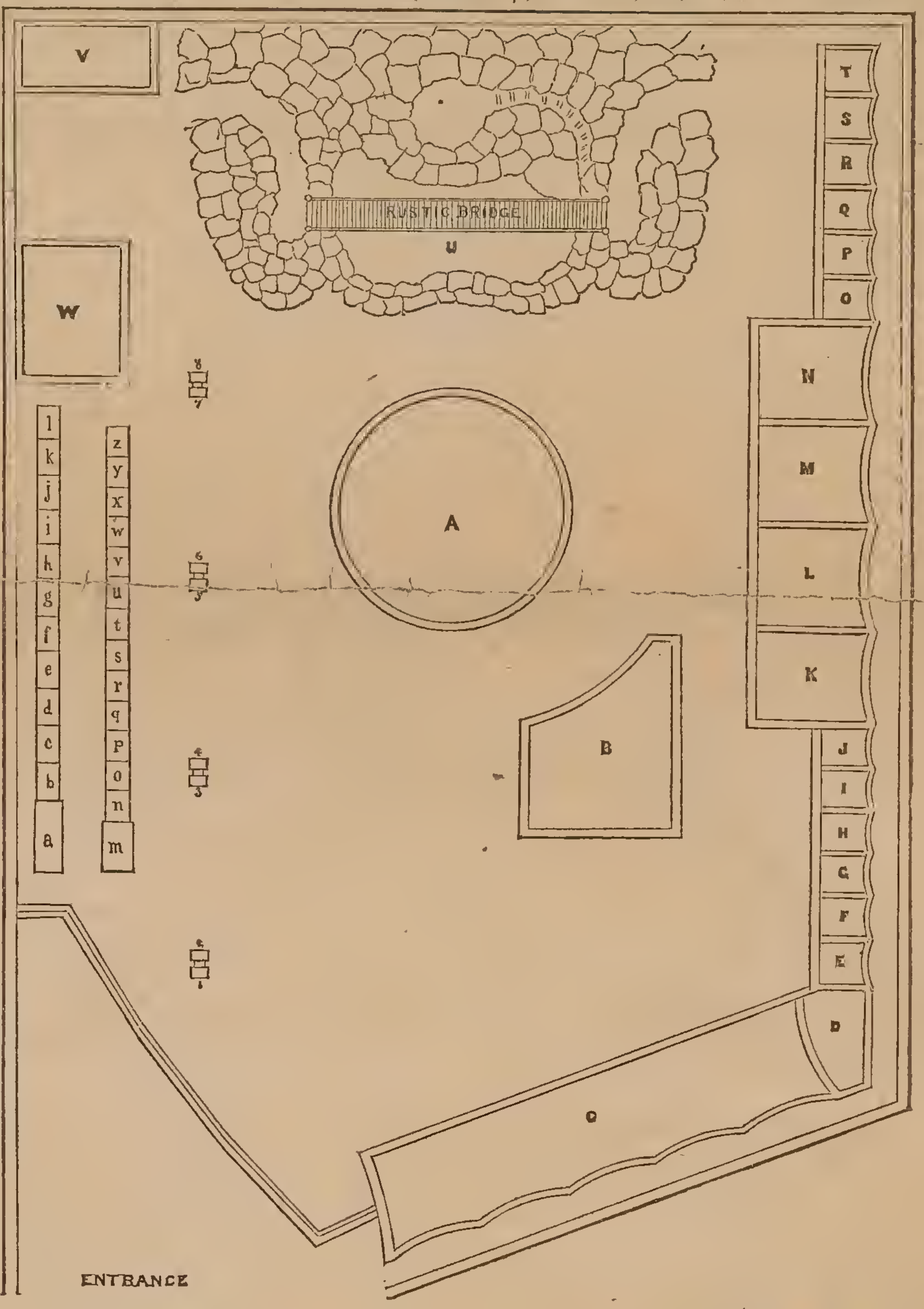
Tank f—Harvest fish, Star fish, four varieties, Hermit Crabs, Pectens, Algae.

Tank g—Serpula, Living Sponges, Living Corals, Aromias, Bryozoas.

Tank h—Anemonies, four varieties, Algae.

Tank i—Crabs, seven varieties, Algae.

Tank j—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Shrimp, Actinia, Algae, Young of edible Crabs, Fiddler Crabs.



Ground Plan of the New York Aquarium.

Tank k—Lafayettes, Algae, Sheepshead Lebias, Little Hermits.

Tank l—Sea Horse, Balloon fish, Sheepshead Lebias, Algae.

FRESH WATER TABLE TANKS.

Tank m—N. Y. Shiner.

Tank n—Brown Cat fish.

Tank o—Pickerel.

Tank p—Japanese Kingiyo.

Tank q—Common Sun fish.

Tank r—Hell Benders.*

Tank s—Long eared Pond fish.

Tank t—Common Pond Fish.

Tank u—White Perch.

Tank v—School of black-nosed Dace.

Tank w—Banded Proteus.*

Tank x—Yellow Perch.

Tank y—Young Brook Trout.

Tank z—Young Salmon.

POST TANKS.

Tank 1—Young Salt Water Actinae, Coral, Algae.

Tank 2—Black Headed Dace.

Tank 3—Crimson Spotted Triton.

Tank 4—Fresh water Lobster, Dace, Algae.

Tank 5—Algae, Unio, Munnon.

Tank 6—Dace.

Tank 7—Young Cat Fish, Lobster, etc.

Tank 8—Sea Anemones; Algae.

Tank 9—Sticklebacks.*

Tank U—Sea Lion.

Tank V—Brook Trout.

Tank W—Fish hatching troughs.*

***The Asterisks that follow many of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on pages 22 and 23 of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpase of answering questions.

Special attention is directed to several new occupants of the tanks of unusual interest. Among these is the Proteus, in tank w, the Hell-benders, in table tank r, and the Sea-horses, in table tank l. For these latter rare marine creatures, our grateful acknowledgements are due to Eugene G. Blackford. The recent visitor will also be attracted by the numerous and beautiful varieties of actinae or sea anemonies.

◆

The official direction and management of the Aquarium may be indicated as follows:

W. C. COUP	Manager.
PROF. H. D. BUTLER	Gen'l Sup't.
MR. W. S. WARD	Naturalist. And Director of Educational Department.
C. F. HOLDER	Assistant Naturalist.
MR. FRED. MATHER	Sup't of Fish Culture.
MR. A. W. ROBERTS	In charge of Fisheries.
F. T. VANCE	Illustrative Artist.

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W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM JOURNAL.

Published Semi-Monthly at the New York Aquarium, cor. 35th Street and Broadway.

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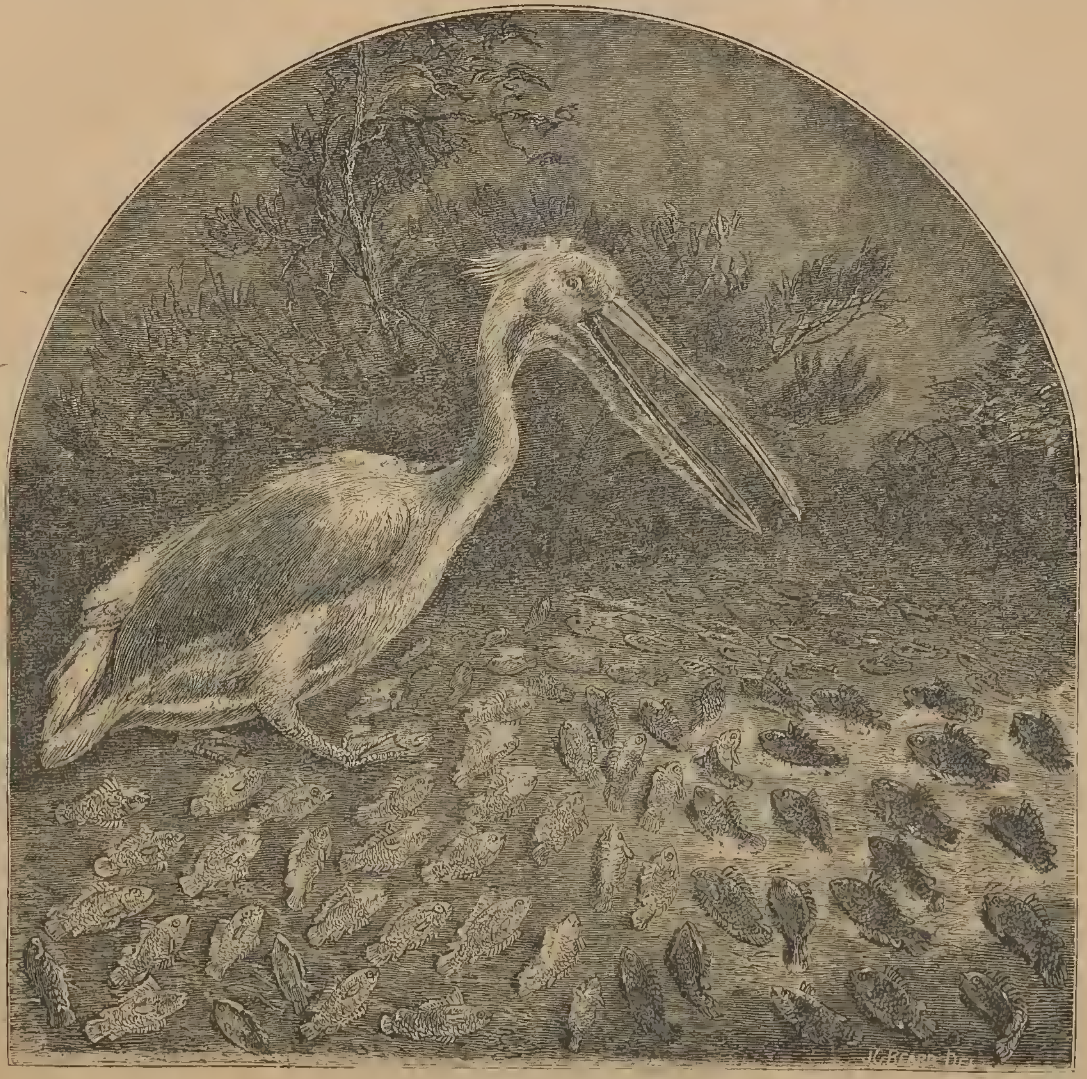
FISH OUT OF WATER.

The conceit of a "fish out of water" is sufficiently incongruous to have given to this phrase a proverbial significance; and yet what is inconsistent with our ideas of the fitness of things is, it appears, not wholly out of nature's power or plan to accomplish. The records of Natural History contain numerous references to the *Anabas scandens* or Climbing Perch, and the *Antinnarius hispidus* or Walking Fish. The former of these fish is a native of Asia, and is described as being remarkable from its possessing an apparatus of very complicated cells situated above the gills. These cells, enclosed beneath the operculum or gill cover, are formed by convolutions of the bones of the throat, and serve to retain a certain quantity of water, which aids to keep the gills wet when the animal is exposed to the air, and thus these organs are able to perform their functions even out of water.—Those who, having charge of great Aquaria, have to effect the transportation of fish overland, know that very many of the more hardy varieties may be kept alive for some time by simply wetting the gills. It appears that the apparatus provided by nature is designed to serve this end, the concealed cells being, in fact, sponges by which moisture is retained, and from which it can be applied at the needed time. That this provision is not a mere "freak of nature," is proven by the fact that these fish are natives of those countries where prolonged droughts often dry up the ponds and leave the fish exposed upon dry land; and it is, therefore, that they may survive the march in search of water, that these special features are added.

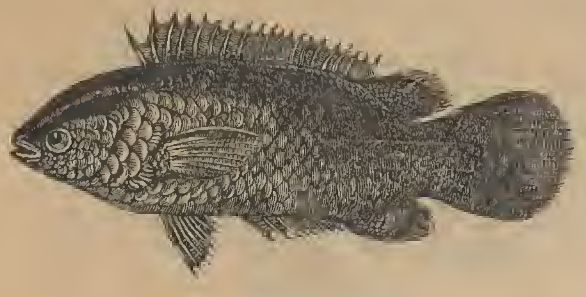
Our young readers, who are doubtless all of them subscribers to that most charming and instructive of Children's Magazines, "*The St. Nichotas,*" will recognize the accompanying illustration as an old friend, and for the benefit of our more mature readers we would state that the illustration is one taken from actual observation, the incident, together with other facts of equal interest, being recorded by Mr. MORRIS, an English government agent in Trincomalee. "I was lately," he writes, "on duty inspecting the walls of a large tank at Nade-cadna, the remaining water in which was confined in a small hollow in the otherwise dry bed. Whilst there heavy rains came on, and as we stood on the high ground we observed a pelican on the margin of the shallow pool gorging himself. We hurried down and found numbers of the fish struggling up through the grass in rills formed by the trickling of the rain. There was scarcely water to cover them, but nevertheless they made rapid progress up the bank, on which our followers collected about ten baskets of them at a distance of about forty yards from the tank. They were forcing their way up the knoll, and had they not been interrupted, first by the pelican and then by ourselves, they would in a few moments have gained the highest point and descended on the other side into a pool which formed another portion of the tank."


J.C.BEARD Del.

ONE AGAINST A THOUSAND.

In another instance the same observer saw hundreds of these fish diverging in every direction from a tank they had abandoned, going a distance of over a hundred and fifty feet, and this over ground so rough that the actual distance traversed must have been half a mile or more.

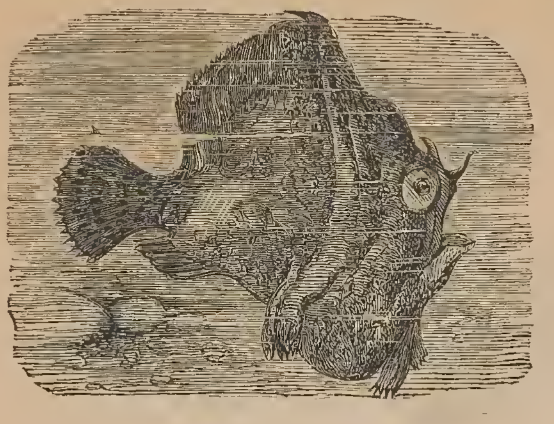
It is also stated that these fish are capable of climbing up the rough stems of palm trees; whether this be true or not, the fact is to a degree endorsed by the natives of India, in whose language the Climbing Perch is known as the Panciri or Tree-climber. It is also the practice of the native fishermen to pack these fish in earthern pots without water, using daily what they need for food, and under these forced conditions the fish live for a week or more.



CLIMBING PERCH.

Our second illustration is that of the Climbing Perch, about one-half its natural size. It will be observed in the case of this fish there appears no special external peculiarities, unless it be that the vertebral column is of unusual size and quite disproportionate to the bulk of the fish. The water cells already described are concealed, and yet when exposed by the dissecting knife are found to be of most curious structure and adapted in a marvelous manner to the purpose they are designed to serve.

In a second instance, however, we find that to the walking fish, *Antinnarius hispidus*, nature has granted external organs of peculiar form and strength which, however they may compromise its grace of appearance, are yet of value to it in its migrations. In fishes of this genus, the carpal or wrist bones are very greatly lengthened and terminate in the pectoral fins, which are short, stiff and powerful, having, as shown in the illustration, more the appearance of claws than fins. This peculiarity of structure is supplemented by others which, taken together, give to the creature a most repulsive though grotesque appearance.



WALKING FISH.

The geographical range of the walking fish is wide, extending over the Atlantic and Indian Oceans. It is a native, however, of the Indian seas and is found chiefly on the coast of Ceylon. Though it is not recorded of these latter fish that they possess the remarkable complication of structure which will enable them to take long overland journeys yet, owing to the peculiar fashion of their fins, they can walk along the rocks somewhat more awkwardly, but with the same certainty as a veritable quadruped.

They are so variable in color, and in the development of certain special organs, that it has been found no easy task to define their precise zoological position; hence Dr. Gunther is of the opinion that other fish in the list of separate species will ultimately be found to be but casual varieties of this one. As a marine fish it differs from its migrating rival the Climbing Perch, and hence, being a dweller in the sea, which never dries up, has little occasion to leave its native element unless it be to catch flies upon the rocks or hasten back to sea from some pool which the retreating tide has left empty and dry.

FISH IN FACT AND FABLE.

1.

DOLPHINS.

WRITTEN EXPRESSLY FOR THE AQUARIUM JOURNAL.

The Dolphins belong to the curious species of marine mammalia called Cetacea. They inhabit almost every sea in the world, though the finest specimens are found in the Mediterranean. Like the whale and the porpoise, they have a clumsy body, small eyes and sharp jaws, but with one distinguishing beauty, to which Barry Cornwall alludes in his poem on the sea:

> " The whale it whistled, the porpoise rolled
> And the dolphins bared *their backs of gold.*"

They often follow in the wake of vessels, making the sea a sheet of brilliant color by their prismatic tints.

> Brought forth in purple, cradled in vermillion,
> Baptized in molten gold, and wreathed in dun,
> Glittering like crescents o'er a Turk's pavilion,
> And blending all the colors into one.

The naturalists of our day give a scientific explanation of this phenomenon of their many hues, and tell us how it is caused by changes on the surface by muscular action; but long ago, before people needed an encyclopedia to tell them what they saw, the sailors, cruising about the shores of Greece and Asia Minor, noticed this sea wonder and told all sorts of fish stories about it.

> " Oh ye delicious fables! when the wave
> And wood were peopled, and the air with things
> So lovely! Why! Oh, why has science grave
> Scattered afar your great imaginings?"

Though the dolphin was sometimes called, from the shape of its jaw, the sea goose, yet the ancients evidently meant no disrespect by the title, for they adopted it as the sacred emblem which has so often puzzled antiquarians. The Greeks too, accredited the dolphin with supernatural wisdom and, believing that he was consecrated to Apollo, gave his name to the famous Delphic oracle. Somewhat later he figures in the charming myth of Arion, the Lesbian musician, who went to Sicily to compete for the prize in harmony; on his way home some avaricious sailors who had no music in their souls, proved themselves "fit for treason, strategy and spoil" by plotting to throw him overboard and seize his treasure. In answer to his prayers, however, they granted him permission to play one tune, after which, grasping his lyre, he leaped into the sea. Spenser describes the scene on the vessel just before Arion makes the desperate plunge:

> Then was there heard a most celestial sound
> Of dainty music which did next ensue,
> And, on the floating waters as enthroned,
> Arion with his harp unto him drew
> The ears and hearts of all that goodly crew,
> Even when the dolphin, which him bore
> Through the Egean sea from pirates view,
> Stood still, astonished at his lore
> And all the raging seas for joy forgot to roar.

No sooner did Arion touch the water than the appreciative dolphin, which had followed the ship, charmed by the concord of sweet sound, rescued him from the watery grave and bore him to his destination at Corinth, where he appeared before the sailors on their arrival, in such splendor as to "make mad the guilty, and amaze indeed the very faculties of eyes and ears."

Perhaps it is owing to this ill turn that sailors to this day have a prejudice against the flesh of the dolphin as food. They believe it to be unwholesome and sometimes poisonous. The last question they have a singular way of testing. Into the same pot in which they boil the dolphin, they drop a piece of silver money. If it comes out untarnished the meat is pronounced fit for the mess; if, on the other hand, it does not pass the "hard money" test, it is thrown overboard, and it is to be feared, does not find Arion ready to return the favors of its ancestors. How much of the sailor's theory is trustworthy, and how much superstition, it is hard to say. The flesh is probably not poisonous, but, being tough and dry, may well prove indigestible and disturb the slumbers of the experimenting tar, as he tosses in his hammock. The Roman Catholics of a few centuries ago regarded this food very differently. As, in those days there was no distinction made between fish and cetacea, such as the whale, porpoise and dolphin, the Romanists were allowed to eat freely, even in Lent, of the flesh of the dolphin though, in fact, it is as much meat as beef, mutton or venison.

There is a tradition not very well founded, that when one of a shoal of dolphins is wounded, the rest unite, like the political journals in a campaign, to pull him to pieces. But, leaving the realms of fiction, and coming down to the scarcely less romantic region of French chivalry, we again find our friend, the dolphin, in high feather, figuratively and literally, for he was borne on the coat of arms, surmounted by the waving plumes of the French princes of the blood. Like our own eagle he was rather too symbolic of free booting rapacity for the national emblem of a civilized country, but he was also a type of power and traditionally of intelligence. In his honor the sunny province in the south of France before the stormy days of the Revolution was called Dauphine, and thence the heir apparent to the throne took his title of the Dauphin.

Thus we trace the history of the dolphin from the remote ages, when fact and fable were so closely intertwined that all the power of modern research has never been able wholly to disentangle their roots, and it is curious to note what an imperial place he holds, both in myth and in history. In every instance he is made the type of the highest development of the country, the national ideal. In Egypt, the land of the sphinx and the solemn mysteries of the pyramids, he was the emblem of wisdom. Among the music-loving Greeks he was known as the giver of Apollo's lyre, and the Franks, whose ruling passion was foreign conquest and territorial aggrandizement, bore him before their conquering troops as the symbol of power. It seems as if all the attributes of the dolphin had thus been exhausted and there were no material left for scientific observer or imaginative dreamer. Yet one fact, his wonderful brilliancy in death, escaped the ancients and has furnished the modern poets with an endless number of similes, of which, perhaps the most beautiful, and certainly the most famous, is Byron's description of a sunset.

> "Parting day
> Dies like the dolphin, whom each pang imbues
> With a new color as it gasps away,
> The last still loveliest, till 'tis gone, and all is gray."

Rachel Farley.

SPECIAL MENTION.

In addition to the regular and constant attractions of the Aquarium, we are prompted to call the visitors attention to several objects of peculiar interest at present on exhibition. First among these is the Japanese Kingiyo. The history of this fish is given elsewhere, and though accompanied by a carefully drawn sketch, yet only a personal examination of it will serve to justify the claim it has upon the attention of the student and naturalist. A near neighbor to this type of marine beauty is its counter type of supreme ugliness, the Menopoma or Hell-bender. Regarding this creature also, full details will be found elsewhere, and yet it may be well to remind the visitor that the structure of this ugly creature and certain of its habits are of unusual interest, as are also those of the Proteus, which occupies an adjacent tank.

It is needless, we trust, to add that the collection of sea anemones or actinae is one of unrivalled interest. If in themselves these marvelously beautiful forms attract the eye, their scientific interest far exceeds any charm which their forms may possess.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

I wonder how many of my young friends know that two prizes have been offered by their Uncle Octopus for the best two compositions on the whale. It must not be longer than four hundred words or shorter than two hundred, and must be thought out and written by a boy or girl who is not over ten years old. Already we have two, but we want more to choose from, and so will wait another week. Hurry up then, and remember that the first prize is a globe with gold fish, and the second a queer book.

Do you know that your ugly-looking uncle is writing a fish story himself, but when he thinks it about time to publish it, along comes somebody with one so much better that he has to make room for it. This is the way it has been this week and he is not very sorry after all, for he has been sitting out on that rock so long that he is getting thirsty and means to take a dive into the sea, leaving his little nephews and nieces to read what his good friend Rev. Alfred Taylor wrote to his children about the Aquarium and its wonders.

Before your uncle goes, however, he wants just to tell you that you must not fail to see the wonderful Japanese fish that is now at the Aquarium. Such a strange and beautiful creature you have never seen before. It came all the way from Japan and is so bright and odd that it would make a good picture for the outside of a tea box, or on the cover of a bunch of fire crackers.

Then there are the beautiful sea anemones, which are like the most delicate blossoms; they seem to grow on a stalk and look for all the world like flowers growing under water. But they are not flowers, but living creatures, and have to be fed each day with little pieces of shrimps and oysters. When they are tired or sleepy they close up like a flower at night and you would never think, to see them then, that they could open out into such beautiful creatures as they are. Some day you shall be told more about them, and perhaps one will be given as a prize for the best composition about them.

A PEEP AT THE NEW AQUARIUM.

BY OUR PAPA.

Well! If this isn't the queerest lot of creatures on earth! Big fish and little fish; crabs, lobsters, and eels; sharks, sea-lions and seals; trout, sturgeon and whales; fins, shells and scales.

Beasts are hardly any novelty to us. For many a year we have seen the waddling hippopotamus, the long-necked giraffe, and the roaring lion, warranted to be of genuine African birth. The sight of these creatures is stale: the perfume of them is awful. But here we have something new, rare, clean, beautiful. The fishes do not sit in sullen captivity, like caged lions, nor rove around like Bengal tigers trying to escape. But each inhabitant of the tanks, with ample room to move about, and with abundant supply of constantly-changing water, seems to enjoy seeing and being seen. The Aquarium is not a mere show. Mr. Coup, and the gentlemen with him who have given the public this beautiful thing, have spent an immense amount of money in providing something which will be, all at once, a school of instruction, a place of entertainment, and a museum of such queer things as we have never yet had an opportunity of studying. This kind of study is not hard work; this kind of going to school is no sorrowful trial.

Let us first look at the biggest thing in the place, the whale. You must not be disappointed to find that the whale is not eighty feet long. Some whales are as long as that, but they are unhandy fellows to manage, and very inconvenient to have in the house. This one is what they call a white whale, or *beluga*. He is very young; we cannot find out exactly how young, for his parents did not come with him to tell us. He is somewhat over twelve feet long, and weighs about as much as a horse. He lives mostly on eels. Just now a bushel of eels has been tossed into the tank. The tank is about ninety feet in circumference, and Mr. Whale swims round and round in it nearly all the time. Yesterday half a dozen boys tried to race him round the tank. He beat the whole party of them. Though he is called a "white whale," his color is a dirty brown, about the color of white lambs which have been in the dust and dirt.

Now that we have seen the biggest, let us look at the funniest. Here are three fellows in seal-skin jackets, and with faces ever so comical. They have round heads, elastic noses, and an expression like monkeys. They look up at us out of their queer little round eyes as if they wanted to laugh at their own mischief. Their seal-skin jackets fit them admirably, for they have worn them since the day they were born. A man comes with a dinner-bell, ringing it as he comes. That means that the three little seals are going to be fed. Up come the creatures from the water, and crowd on the little stone platform, like passengers on a Mississippi steamboat, rushing for the best seats at the dinner table. The seals are just as greedy as the passengers. They take their victuals raw, however, and alive, too. The man with the dinner-bell throws fish to them, and the people crowd around the stone fence of the tank to see the funny little fellows fight and tussle for each fish that is thrown. The seals have never learned politeness; though one of them, being of a musical turn, has learned to grind a barrel organ.

But we cannot spend all day on seals and whales. Here, at one end of the great hall, is a tank sixty-five feet long; its front made of great panes of plate glass an inch thick, and its back and sides of solid brick and stone walls. In this great tank are some of the larger fish. At eating-house doors the green turtles which are to be made into soup are forced to lie on their backs, looking so uncomfortable that Mr. Bergh has to come along and take pity on them. But here is a great green turtle, looking as independent and happy as if he had never heard of soup. He paddles round as if he owned the whole tank. Look at the skates, unwieldy, odd-looking, flat things, with faces almost like those of human beings, and tails like spikes. Here are two different kinds of sharks; one with a sharp nose, while the nose of the other is as blunt as a ball. In the corner sits a black-fish who looks as if he wanted to play he was dead. You may watch him by the hour without seeing him move. A big lobster walks past him, and claws around him, but the black-fish is so dignified and solemn that he is above taking notice of such an irregular-looking genius as a lobster.

What a horrible howl that is from the other end of the hall! Who is being put to death? Oh! it is nothing but the sea-lion expressing his views on something or other. There is no music in his voice, though he makes an abundance of noise. When he speaks out it sounds like a mixture of locomotive whistle and bear-growl. He lives on raw fish, which he seems to swallow without chewing, making great mouths at them as they go down. Nobody would want this creature for a companion.

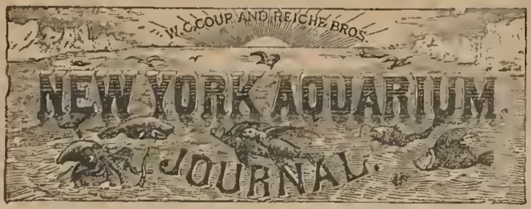
And now for one of the most beautiful things. Yonder large tank seems alive with gold-fish. The gold-fish is a carp, with bright, orange-red scales. The unhappy ones which some people keep in small glass globes are objects of pity, and ought to be turned loose in the nearest pond. But in this great tank, with plenty of water room, are over two hundred gold-fish, on dress parade, all looking perfectly happy. There is always a crowd around the gold-fish tank.

Close by is one of the most curious fishes ever seen, the American angler. It is said that some boys, when they go to fish, use their mouths for bait-boxes and carry worms in them. Whether this is true or not, we know that the American angler uses his mouth for a fish basket. Such a mouth! It is larger in proportion to his body than the mouth of any other creature we ever saw. It is fringed with something which looks like sea weed. When the angler is sitting quietly, thinking what he will do for his next meal, he looks like an old, flat, mud-covered stone. He has a flexible fishing-rod, or tentacle, fastened in his back. He uses this to entrap the small fish which swim near him. Then he opens his huge mouth and scoops them in, keeping them inside of his jaws to swallow at his leisure.

But we cannot stop now to look at all the marvelous things in this Aquarium. The English people have their celebrated Brighton Aquarium, but our New York one is better than that, or indeed than any in all Europe. We can here study every form of life that is kept up under water. We can watch the nimble trout and the lazy alligator. We can play with the alligator's children, the delightful little pets, as sportive as kittens. We can examine the remarkable gymnastics of the crabs and sea-spiders. We can learn architecture from the funny little stickleback, who builds his nest under the water. We can admire the shining scales of the Lafayette fish, and the sleek coats of the comical-faced catfish, and we can run away from the scowly faces which the sea raven, who looks something like a toad, makes at us.

We are beginning to make the acquaintance of some fish which we have not been in the habit of seeing, except in the frying pan or on the gridiron. We are glad that so many intelligent people are coming to see and study for themselves. This Aquarium is not to be looked on as an ordinary show. It is the people's college of fishery; and we will make the most of what we can learn from it.

Farewell for to-day, alligators, trout, whales, shad, shrimps, dog-fish, catfish, and all you other sorts of fish. We will see you again.—*The Advance.*



W. S. WARD, Editor.

NEW YORK, NOVEMBER 22, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

In giving to our readers the following editorial endorsement of the New York Aquarium, from the November number of the *Popular Science Monthly*, it is done with a twofold purpose. First—that the public may be assured of the genuine value of the Aquarium, since it meets the favor of so worthy and just authority; and Second—that we may direct attention to the plan, now rapidly maturing, by which the manager of the Aquarium proposes to render the institution readily accessible to the youth of our city and their instructors, and the efforts they are making to favor the cause of science and popular instruction, through the agency of this enterprise.

The following is the editorial endorsement above mentioned:

"The devotees of rational amusement, the lovers of natural history, and the friends of scientific education, in this city, are to be congratulated on the establishment of the Aquarium which was recently completed and opened to visitors. Undoubtedly the devotees of rational amusement are not so numerous as they might be, but they will increase in numbers as increasing facilities are afforded for combining agreeable recreation with instructive observation in the acquisition of pleasant knowledge without much trouble. As a means of increasing the general taste in natural history, and affording students the opportunity of familiarizing themselves with forms of life hitherto inaccessible and known chiefly in books, the Aquarium is invaluable, and will be a great help in promoting the work of science. The museum shows us dead specimens stuffed, dried, and variously preserved, and is of course not without interest. But the Aquarium opens to us the living, moving curiosities and wonders that are nowhere else to be seen. What the menagerie is to the creatures of the forest, the desert, and the prairie, the Aquarium is to the tenants of the lake, the river, and the ocean. But, while land-animals have long been captured and collected for inspection, the Aquarium is a new and recent affair, involving great difficulties in its successful management. These difficulties can only be overcome at large expense, by persevering experience, and through special and thorough knowledge of the conditions of life of an immense variety of aquatic creatures. The opportunity such an establishment opens to the scientific observer, investigator, and experimenter, should be highly prized, and we have no doubt it will be well appreciated by this class of students.

In an educational point of view, or as a means of popular instruction, a well-stocked aquarium cannot fail to be of the highest value. Natural history is a growing subject in our schools, but is so generally pursued merely from text-books which give no real knowledge, that a great available museum of living objects is precisely what is wanted to give reality and efficiency to this branch of study. The New York Aquarium should be brought into very close relations with the common-school system of the city. We are glad to observe that this element of its usefulness has not been overlooked in the plan and management of the enterprise. Provisions for study, instruction, and systematic observation have been incorporated with it, and this feature has been held so important as to be placed in special charge of a cultivated naturalist, Mr. W. S. WARD, who has been abroad this season and visited the chief aquariums of Europe, with a view of acquiring information that will be valuable to the scientific management, and who will devote himself to the educational service of the institution.

It is a noteworthy fact that we are indebted for the New York Aquarium entirely to private enterprise. There was talk that the city would establish something of the kind in the Central Park ; but it came to nothing, and, after the municipal fizzle over the fossil restorations undertaken by Mr. WATERHOUSE HAWKINS, we may conclude that it was perhaps best that the city did not undertake this work. But what it was unable or disinclined to do has been projected and carried out by the persevering enterprise of Mr. W. C. COUP, who has devoted his energy to its organization, and risked his money upon his chance of success. The aquarium is an honor to this metropolis and promises a large benefit to the public, and it should be liberally patronized and well sustained. We have no doubt it will meet from all classes with the encouragement it certainly deserves."

In response to this just recognition of the value of Aquaria as an aid to popular instruction, we would state that Mr. COUP has under consideration the plan of admitting to the Aquarium the public school pupils and their instructors at mere nominal rates. In addition to this, it is his purpose to so adjust the scale of prices that those of our public instructors who may desire to study the habits and structure of the fish, may do so without any serious drain upon their purses. This purpose of the manager is a determined one, and measures are already on foot to put it in definite form. Already has the Aquarium been thrown open to the free admission of all the children of our orphan asylums, and the heads of our educational institutions will find on inquiry that a generous recognition of their claims has already been made.

The educational department, as has already been announced, is free to all who desire to avail themselves of the advantages here afforded. A fine scientific library is open to the use of students and the public. A naturalist's laboratory is also completed and fully furnished with all needed appliances for special investigation; and the director of this department not only stands ready to assist in this service, but specially requests the presence of those whose studies or tastes incline them to this service.

Without any purpose of self-commendation it is yet justly claimed that, as now constituted, the New York Aquarium is without a rival in the encouragement and advantages it offers for free scientific instruction and research.

HINTS TO THE PUBLIC.

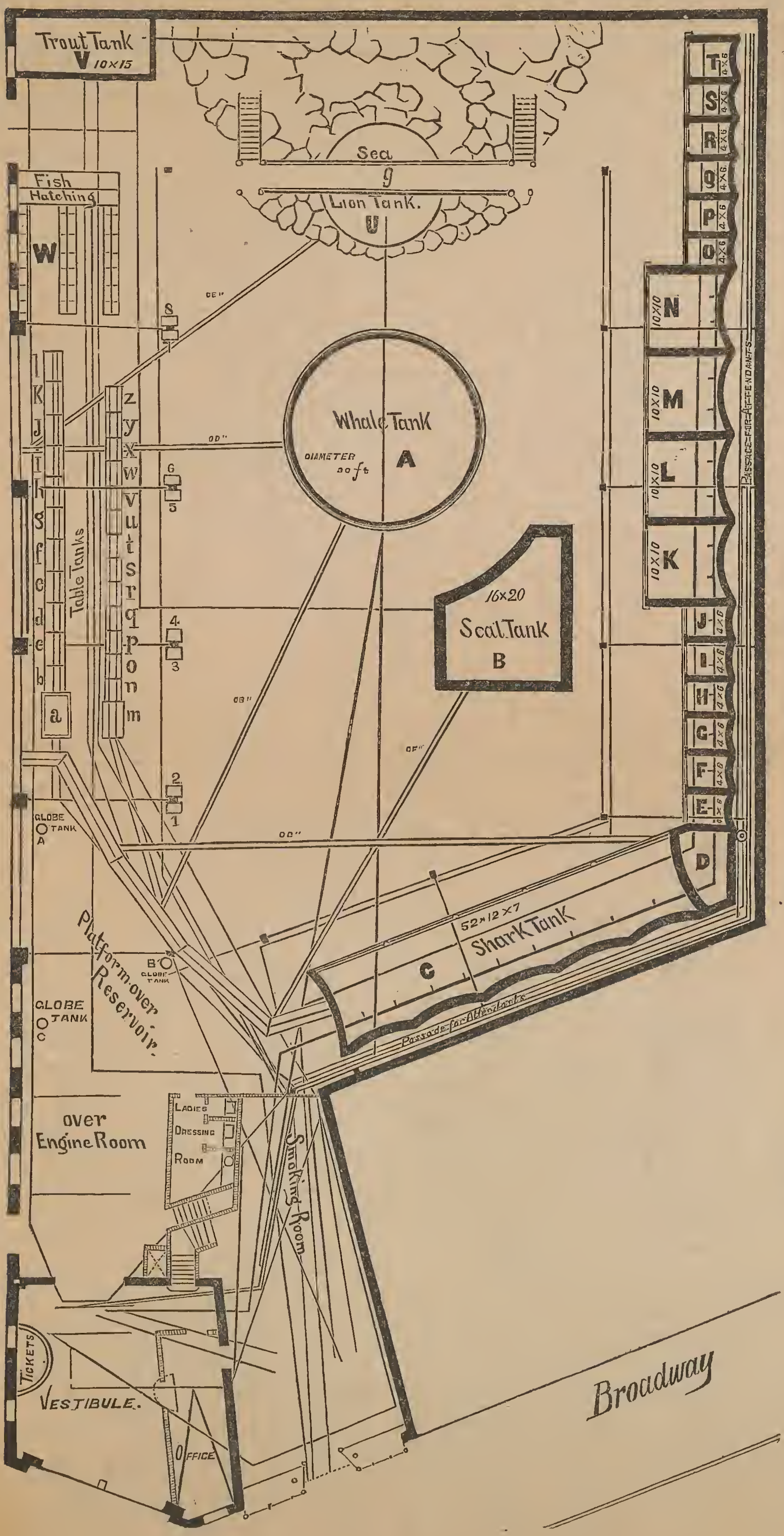
It seems due to the manager of the Aquarium, as well as to the public whose favor he desires, to make the following suggestion, namely:—Fish are, of all creatures, the most sensitive to change, either in location or habits. Hence it is not surprising, though often discouraging to those most interested, to know that at least 50 per cent of the fish which find their way to the tanks are not destined long to remain therein. The restraint of confinement and the unavoidable accidents incident upon their transportation, render their prolonged existence—save in the more hardy species — extremely doubtful. Hence our advice to those specially interested in the examination of the new and rare specimens exhibited is, that immediately after the presence of some new object is announced, *that it be seen at once.* An instance illustrative of this is afforded in the history of the Anglers or Sea-devils. The present specimen is the third one which has been received within the last two weeks, the first two having died almost immediately after their arrival; and to those who miss seeing this curious creature we can but say that it will be their own fault rather than any neglect of the manager. What is true of the "Angler" will prove true in many other instances. Hence this hint, which we trust will be taken as "a word to the wise," and need no repetition.

OUR GROUND PLAN.

In presenting to our readers the ground plan of the Aquarium, it is done mainly with the purpose of indicating the extent and complications of the distributing system. Already, in the first number of the *Journal*, an extended description of the method of aeration was given, and to this we refer for the details of the work.

At present, in connection with the illustration, it is only necessary to add that there has been no exaggeration in the number and extent of the circulating pipes used; and an examination of their position will serve to indicate their purpose. Let it be remembered that the two separate series of fresh and salt water tanks require each its own system of reservoirs, pumps, distributing and conducting pipes; and in the case of the whale, sea lion, seal and hatching tanks, separate supply and delivery pipes are needed, since the water used in these cases cannot be purified by aeration, but must be constantly replaced by fresh supplies from the sea, or, in case of the hatching troughs, from the Croton mains.

The plan as here presented may also serve to assist the visitor in the location of the fish, as given on the last page, although the plan there presented was designed for this special purpose.



GROUND PLAN

OF THE

MAIN PAVILION

OF THE

New York

AQUARIUM

Cor. 35th Street & Broadway,

SHOWING THE

POSITION AND RELATIVE SIZE

OF THE

MARINE & FRESH WATER TANKS

THE

Sea Lion Rockery,

THE

HATCHING TROUGHS

AND THE

TABLE TANKS,

TOGETHER WITH

A Full Exhibit

OF THE

Numberless Water Pipes

And their Connections,

Through which the Fresh and Salt Water is distributed to the Tanks or returned to the Reservoirs.

For a complete Index to the Contents of the Tanks, see the LAST PAGE of the *Journal*.

W. C. COUP, Manager.

FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

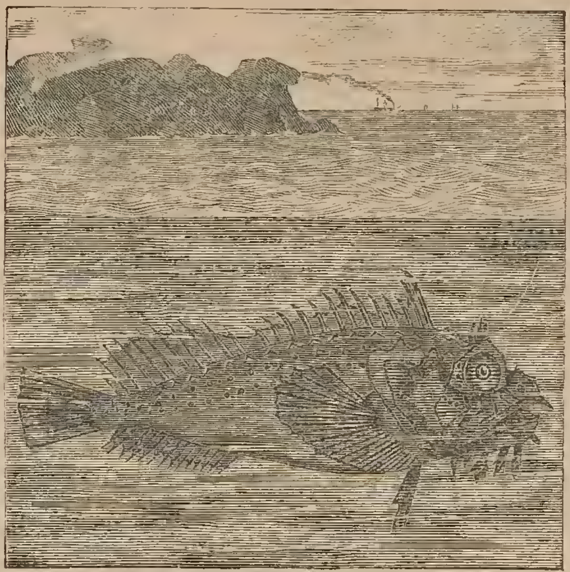
The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Only two troughs are in use at present and are filled with the ova of the California Salmon which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalists the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years, but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, according to the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Later in the season the other troughs will be occupied by the Land-locked Salmon from Maine, a fresh water variety, the Lake Trout, the Brook Trout and the Whitefish; these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

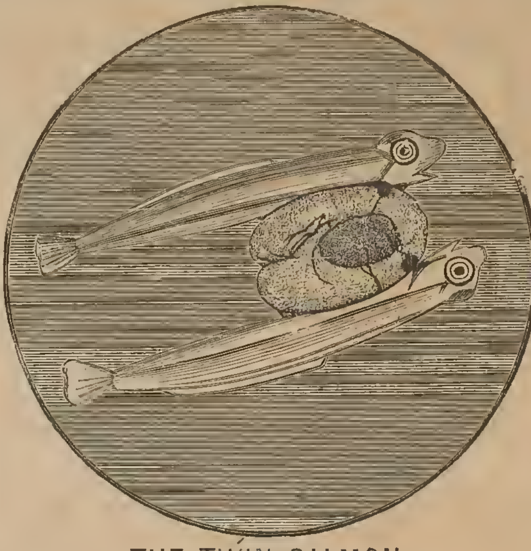
This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.



THE SEA RAVEN.

Hemitripterus Americanus.

Closely connected by family ties to the Sea Swallow, is the Sea Raven, a fine specimen of which may be seen in table tank d, and it is always surrounded by *doubtful* admirers who speculate as to the *ownership* of the wonderful tufts, "bobs," and masses of disjointed flesh that seem to cover it, and the visitor is not rarely led to believe that by a system of inactivity it has been covered with a growth of aquatic plants and verdure. But they are all "real," and this fantastic ornamentation is the bona fide work of nature. The specimens in this tank were captured near *Gay's Head*, Mass., and are there known as *Sculpins*, and make sad work with the lines of the patient fisherman. It is subject to great variation of color, and the Aquarium will soon possess specimens, varying from the rich, russet brown to a bright *carmine* yellow and red. They feed entirely upon small fish, but do not reject any morsel that their capacious mouths can cover.



THE TWIN SALMON.

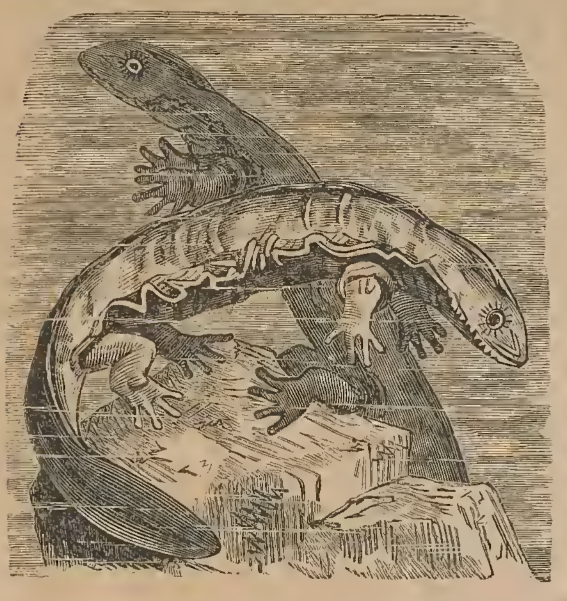
The Twin Salmon or "salmonese twins," as the aquarium wag has christened them, are among the most interesting objects now displayed in Mr. Mather's department. The above illustration taken directly from the life is a careful representation of these queer little creatures as they now appear under the magnifying glass. The two bodies are attached to one sac, but each fish is perfect in itself. The connecting vesicle is filled with oil globules, arteries and veins, and it was expected that a microscopic examination would discover a diaphragm separating the circulation into two distinct systems. The closest scrutiny, however, fails to discover this wall and the circulatory systems appear so intimately connected that the blood flows freely from one body to the other, impelled, however, by two hearts.

Mr. Mather is of the opinion that there is but little chance of their living after the absorption of the sac, for if they survive till that time the abdomens will still be joined by the membrane of the sac, and being thus compelled to swim on their sides, great difficulty will be experienced in obtaining food. In this instance, however, a careful system of artificial feeding will be adopted in case the pair reach an age when they will need such nourishment. From the extended observations of Mr. Mather, it appears that these deformities are quite frequent in the salmon family, which includes the trout, and in hatching one hundred thousand eggs, there may be from three to five hundred abnormal specimens, comprising crooked backs, twisted heads and tails, and in some instances two or even *three* heads are attached to one body. Several interesting examples of these "freaks of nature" can now be seen in the display dishes at the hatching troughs, or will be shown to the visitor on inquiry of Mr. Mather.

GAR FISH.

Lepidosteus Osseus Liu.

In the Bony Gar Pike we find a living representative of the old *Ganoid race* that are now only known by their impressions in the hardened sand-stones that tell of seas that rose and fell, perhaps millions of years ago. The fish is completely encased in a coat of smooth, thick, and rhomboidal *scales*, an armor equal to any foe. They grow to a large size, often exceeding four feet, and with their long bill armed with needle like teeth, and powerful fins, form no mean antagonist to the fisherman or sportsman.



THE ALLEGHANY HELL-BENDER.

Menopoma Alleghaniensis.

The interest which attaches itself to the series of fresh water tanks at the Aquarium is mainly divided at present between the Proteus as seen in tank w, and the subject of the present sketch. As its name indicates, the Hell-bender is found in the Alleghany river and other tributaries of the Ohio. It is also known as the Salamander of the Alleghanies. The specimens shown in tank r were presented to the Aquarium by the Buffalo Society of Natural Sciences, through its Secretary, Mr. A. R. Grote, who also read an interesting paper on the subject before the American Academy at its last meeting. This gentleman also records, in the *American Journal of Science*, the interesting fact that this animal sheds a transparent membrane, which he believes to be the exterior layer of the skin. While observing one in the Aquarium of the Buffalo Society of Natural Sciences, an almost complete skin, all the feet and toes being readily perceived, was seen floating in the water, and later the creature was discovered in the act of swallowing his former covering, a practice which has also been observed in the toad. In a recent communication Mr. Grote describes this operation of shedding the skin, from which we learn that this thin and transparent membrane is first seen to loosen and separate from the entire surface of the body, appearing at this stage like an envelope or glove in which the animal is contained. By a number of wide gapings, during which the mouth is opened to the fullest extent, the skin is parted about the lips, and then commences to fold backward from the head. Convulsive and undulating movements with the body and fore legs are employed to extract these from the loose skin. The skin then readily falls backward, as the animal crawls forward and out of it, until the hind legs are reached, when the menopoma turns round upon itself, and, taking the skin in its mouth, pulls it over the legs and tail. The operation reminds one of taking off clothes. The cast-off skin is retained in the mouth and finally swallowed. The operation is quickly performed. The visitor who watches the menopoma, will observe a swaying motion of the body; this action is not yet fully accounted for, though it is possible that it is connected with the animal's desire to rid himself of his ugly skin.

A female Hell-bender opened on the 21st of August contained well developed eggs attached by a membrane to the oviary. These eggs are laid in a connected string, and are deposited along the muddy banks of the river. At this time there is a change in the external appearance of the creature. The tail broadens, and there is a plaited extension of the skin along the sides of the body.

The two specimens of Hell-benders now on view are worthy of special study, and, as in many other cases, we would advise those interested to view them as soon as possible, as already the confinement of the Aquarium has resulted in the death of one rare creature of this class.

THE BANDED PROTEUS.

Menobranchus Lateralis.

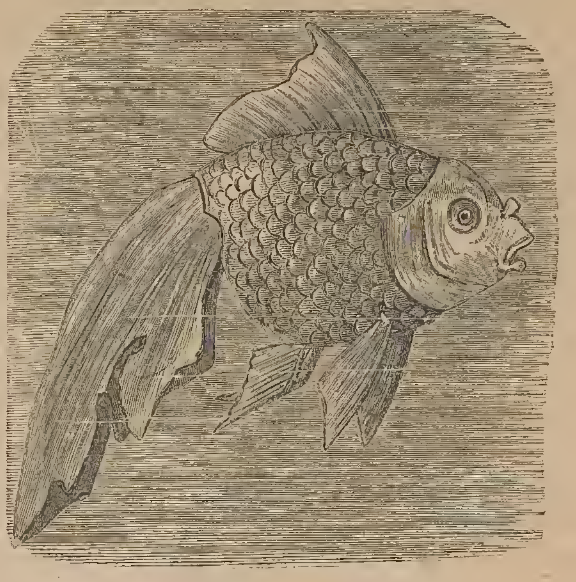
The Banded Proteus now to be seen in table tank w of the fresh water series, is one of the most curious and interesting of aquatic animals. As the visitor to the Aquarium will be able to observe its peculiarities of form and structure, no extended description of them is needed. It will be well, however, to direct attention to the peculiar form of the gills, there being three on each side, ramified and fringed, and of a red color, on account of the blood which circulates through them. Dr. Beall invented an ingenious arrangement by which this phenomenon of circulation could be witnessed. The blood dics are of so extraordinary a size that they can be distinguished by an ordinary pocket magnifier while passing through the vessels.

The Banded Proteus is found in Lake Champlain and at the outlet of Lake George. It is also to be found in certain of our Northern lakes, where its presence is a bane to the fishermen, since it has a peculiar fondness for the spawns of the white fish. Its movements in the water are usually slow, but, from the size of its tail, it is evident that when occasion demands it can move with great speed. They are said occasionally to come upon the land. Its color is brownish with blackish spots, and its length varies from one to two feet.

Wood, writing of the *proteus anguinus*, says that the discovery of this animal is extremely valuable, not only as an aid to the science of comparative anatomy, but as affording another instance of the strange and wondrous forms of animal life which still survive in hidden and unvisited nooks of the earth. The specimens now at the Aquarium are displayed to the best advantage, and the visitor can but regard them with curious interest.

HERMIT CRABS.

Scattered at intervals on the shingle-bottomed tank (j) or in closely collected groups, will be seen numbers of those quaint Crustacea, remarkable for their habit of approaching the deserted shells of other animals, for the better protection of their otherwise tender and defenceless hinder quarters. This foregoing peculiarity has won for them the popular title of Hermit Crabs, although on account of their extremely irritable and pugilistic disposition, they are about equally well known as Soldier Crabs. The Hermit Crab (*Pagurus bernhardus*), is most frequently found, when young, inhabiting the cast-off shell of the Dogwinkle (*Purpura lapillus*), and at a more advanced condition of growth than that of the Common Whelk (*Buccinum undatum*). The process by which the Hermit Crabs have gained possession of these highly ornamental residences, in place of their former sybaritic hut, is an artificial one, each individual having been originally extracted from an ordinary Whelk shell, and left in company with others of a foreign type from which it almost immediately made a selection. On the shores of tropical seas, Hermit Crabs normally inhabit these brilliantly-colored and fantastic-shaped abodes, including also the beautifully-spotted and naturally highly-polished Cowries; in this latter instance, the species of Hermit has a specially flattened body and general contour to enable it to utilize these remarkably narrow-apertured shells as a suitable protection.



JAPANESE KINGIYO.

The presence in the Aquarium of this wonderfully beautiful, and strangely grotesque fish, should be a cause for special congratulation. The specimen exhibited in table tank p, of the fresh water series, was brought from Japan by a gentleman who has furnished the following interesting facts regarding it:

Starting from Japan with eighty-eight, he arrived in Baltimore with but seven, all of which are now alive and in good health. The captain of the steamer taking great interest in his efforts to introduce the fish to America, built a tank on the steamer to accommodate them, and took in a supply of river water; but it was soon found that the motion of the ship dashed the fish against the sides of the tank and many were lost. To obviate this a smaller tank was built and suspended like the compass, which counteracted the motion of the ship; but notwithstanding all the care bestowed on them only fifteen arrived in San Francisco, all in a very weak condition. Of these eight subsequently died.

The Japanese claim that the brilliant colors displayed in this fish, and the wonderful development of its triple tail, is the result of many years careful breeding. This one is an unusually fine specimen. In Baltimore great care was taken of the seven survivors, and during the summer they spawned, the result being about fifty young fry, which exhibit all the peculiarities of the originals. It is the intention of the owner when he has a sufficient stock, to donate them among persons who will take an interest in them and carefully raise them.

For the benefit of any of our readers who have not as yet been able to visit the Aquarium, we would state that in outline and general appearance the above illustration, drawn from life by Mr. Vance, is exact and truthful in every particular. The body is red in color, similar to that of a brilliantly-hued gold fish; the tail, however, is a pearly white, and as it rests in the water presents the appearance of a fine, silken fabric, terminating in a delicate fringe. In addition to the peculiar attraction which the form of the fish is to the general observer, the naturalist will find in its very existence and the tradition regarding its origin theme for thoughtful study.

If the Chinese can accomplish such results in the modification of special features, by aid of their crude appliances, there is every reason to believe that, with our more complete arrangements, still more marvelous results may be obtained. At least the attempt is to be made, and already the naturalist of the Aquarium has taken measures to apply and test the Chinese methods with the hope that still more valuable results may be secured. A careful record of these experiments shall be kept, and at a future day we shall hope to present to our readers, and exhibit to the public, specimens of fish, the results of special culture, which will rival in interest the oriental beauty now on exhibition.

THE AQUARIUM GUIDE.

The following tabulated list is designed, with the assistance of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER SERIES.

Tank A—Whale.

Tank B—Seals.

Tank C—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Prickly Skate, Summer Skate, Sand Shark, Smooth Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog.

Tank E—Striped Bass, Weak Fish.

Tank F—Five varieties of Star Fish.

Tank G—Star Fish, five varieties of Sea Anemones, Angler.

FRESH WATER SERIES.

Tank H—Common Cat Fish, Blue Cat Fish, Yellow Perch, Fresh Water Dog Fish.

Tank I—Yellow Perch, Algal (Brook Pickerel), Shiner, Blue Cat-fish, Long eared Pond fish, common Pond fish, Mullett Sucker.

Tank J—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank K—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike,* Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Water Sheepshead, Long finned Chub Sucker.

SALT WATER SERIES.

Tank L—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank M—Lafayette Fish, Flounder, Blue fish, Young Skate, Black fish, Striped Bass. Cod.

Tank N—Blue fish, Blackfish, Striped Bass, Manhaden, Lafayette, King Crab.

Tank O—Killi-fish, Cottus, Toad Fish.

Tank P—Lobster, Lady-crab ; Edible Crab, Spider Crab, Hermit Crab,* Spotted Crab, Lobster.

Tank Q—Spotted Cod Lings.

Tank R—Rock Cod.

Tank S—Black Sea Bass.

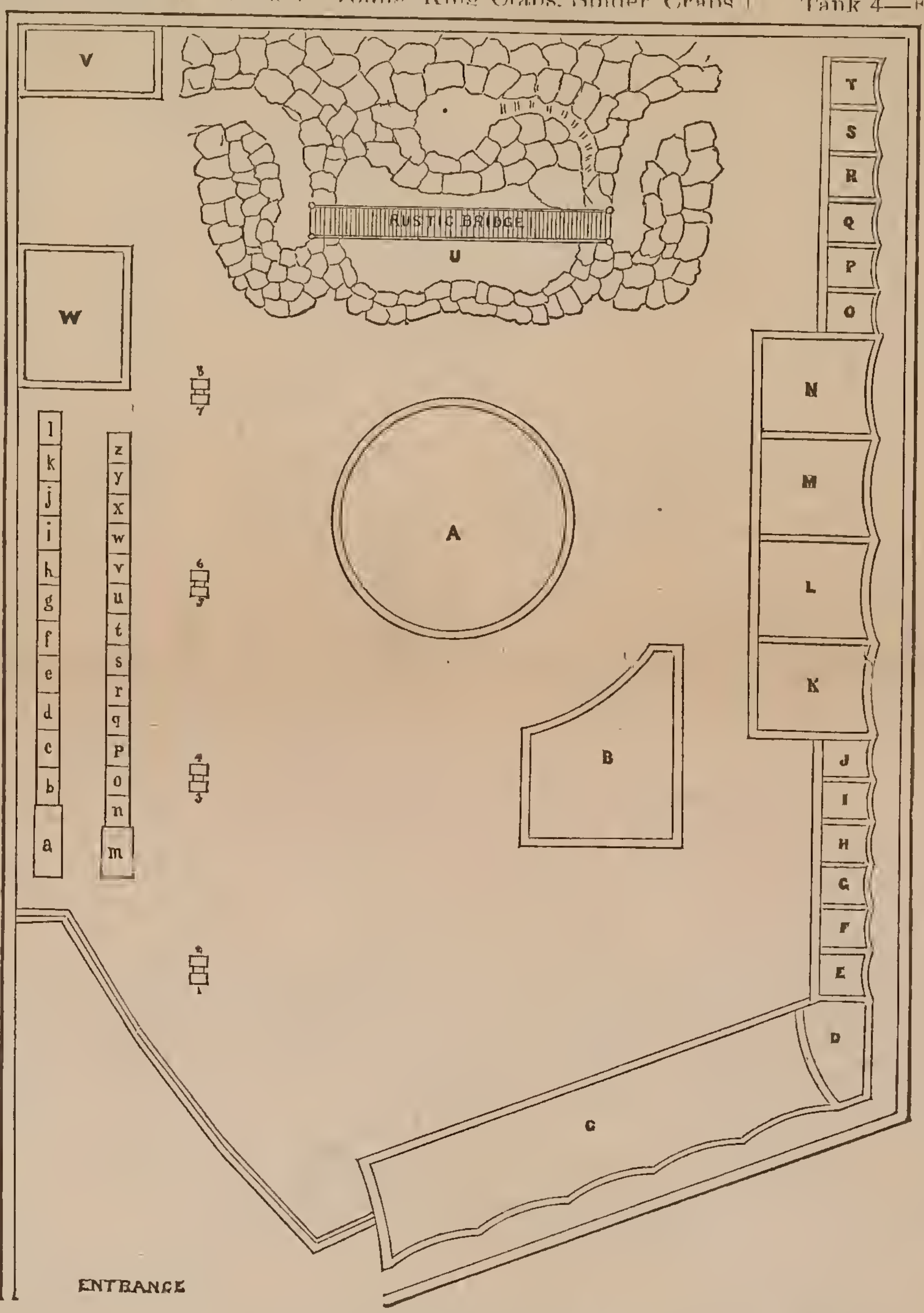
Tank T—Lobster, Striped Bass.

SALT WATER TABLE TANKS.

Tank a—Anemones, Armadillo Shells.

Tank b—Porgies, Pectens.

Tank c—Striped Gurnards, Barred Killifish, Algae, Toad Fish, smooth browed Bull Head.



Ground Plan of the New York Aquarium.

Tank d—Sea Raven,* Bermuda Lobsters, Lady Crabs, Spider Crabs, Rock Crabs, Winter Flounder, Pectens, Sheepshead Lebias, Algae.

Tank e—Wharf fish, or Checsey Black fish, Spider Crab, Pectens, Lebias, Algae, Young Tantog or Blackfish, Cunner.

Tank f—Harvest fish, Star fish, four varieties, Hermit Crabs, Pectens, Algae.

Tank g—Serpula, Living Sponges, Aromias, Bryozoas.

Tank h—Anemones, four varieties, Algae, Living Corals.

Tank i—Crabs, 7 varieties, Algae, Shrimp.

Tank j—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Shrimp, Algae, Young of edible Crabs, Fiddler Crabs.

Tank k—Lafayettes, Algae, Sheepshead Lebias, Little Hermits.

Tank l—Sea Horse, Sheepshead Lebias, Algae, Serpula, Periwinkle and Spawn.

FRESH WATER TABLE TANKS.

Tank m—N. Y. Shiner.

Tank n—Brown Cat fish.

Tank o—Pickerel.

Tank p —Japanese Kingiyo.*

Tank q—Common Sun fish.

Tank r—Hell Benders.*

Tank s—Long eared Pond fish, and Fresh Water Lobster.

Tank t—Common Pond Fish.

Tank u—White Perch.

Tank v—School of black-nosed Dace.

Tank w—Banded Proteus.*

Tank x—Yellow Perch.

Tank y—Young Brook Trout.

Tank z—Lake Trout.

POST TANKS.

Tank 1—Young Salt Water Actinae, Coral, Algae.

Tank 2—Black Headed Dace.

Tank 3—Crimson Spotted Triton.

Tank 4—Fresh water Lobster, Dace, Algae.

Tank 5 — Algae, Unio, Munnon.

Tank 6—Dace.

Tank 7—Young Cat Fish, Lobster, etc.

Tank 8—Sea Anemones ; Algae.

Tank 9—Sticklebacks.

Tank U—Sea Lion.

Tank V—Brook Trout.

Tank W—Fish hatching troughs.*

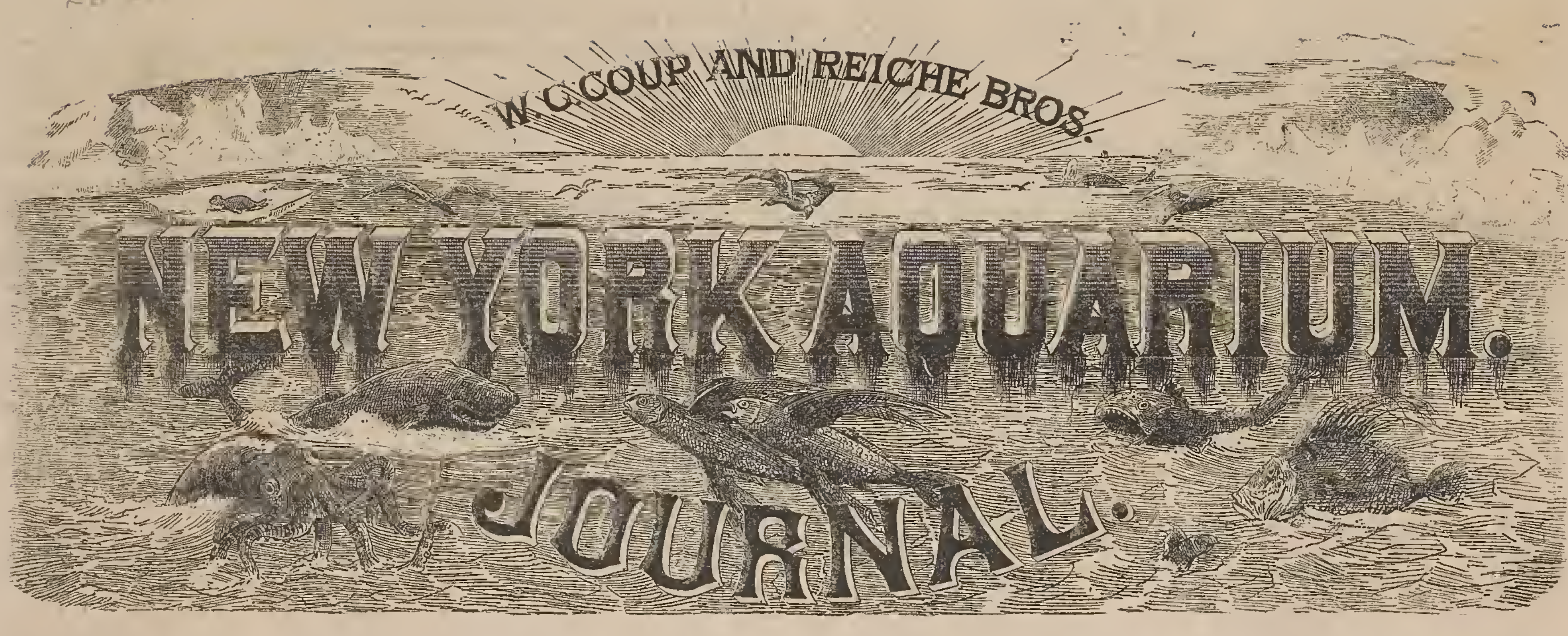
***The Asterisks that follow many of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on pages 30 and 31 of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpase of answering questions.

The manager is pleased to announce that negotiations are now on foot with Mr. Seth Green, for the following supply of fish and fish spawn ; Salmon and Brook Trout with spawn of the same, and California and Kennebec Salmon of different ages, and if possible a full supply of White fish spawn. The spawn above mentioned will be placed in charge of Mr. Mather on their arrival.

◆

The official direction and management of the Aquarium may be indicated as follows :

W. C. COUP	Manager.
R. J. EDGAR	Secretary
PROF. H. D. BUTLER	Gen'l Sup't.
MR. W. S. WARD	Naturalist. And Director of Educational Department.
C. F. HOLDER	Assistant Naturalist.
MR. FRED. MATHER	Sup't of Fish Culture.
MR. A. W. ROBERTS	In charge of Fisheries.
F. T. VANCE	Illustrative Artist.


W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM JOURNAL.

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VOL. 1. NEW YORK, WEDNESDAY, DEC. 6, 1876. NO. 5.

ON SEA-SQUIRTS.

BY PROF. ANDREW WILSON, M. D., EDINBURGH.

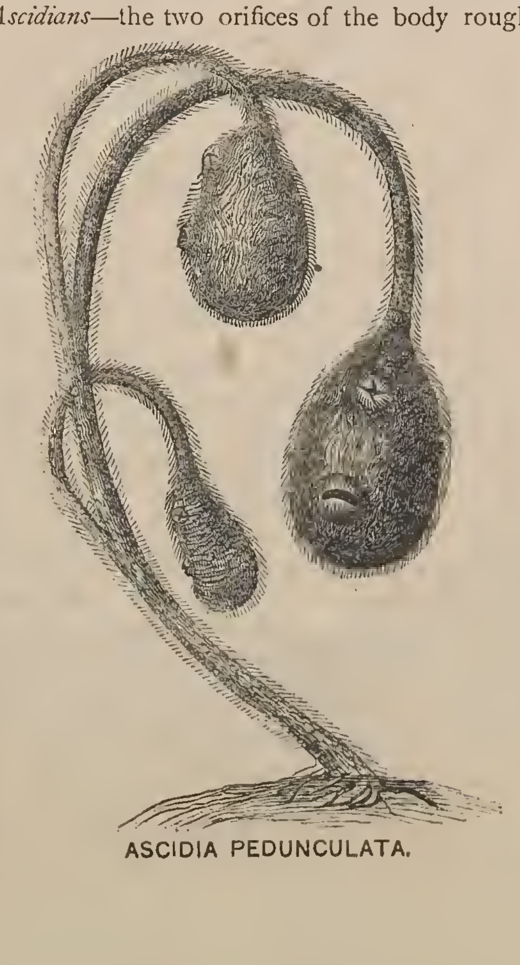
Under the name of Sea-squirts curious beings may be found on all our coasts, attached to stones, to the broad fronds of tangle, and to other fixed objects at low-water mark. At first sight these creatures exhibit very little that is attractive, each organism presenting, in fact, the appearance of a soft, leathery-looking jar or bottle, with two necks or apertures. From this outward resemblance to a flagon, certain witty rhymes about "leather bottles" have been composed; especially in allusion to the theory of some naturalists, that, in the young form of the Sea-squirt, man may trace his own ancient progenitor.

The size of the more common species of Sea-squirts is never very great. From half an inch to an inch in length, may be regarded as fair average dimensions of these beings, which, in their outward aspect, as we have remarked, look like miniature jars, each fixed by the bottom to the rock, whilst two apertures exist on its upper surface. The body is encased within a tough outer skin, of leathery texture. And zoologists some years ago were very much surprised to find that, when chemically examined, this outer skin was composed almost wholly of a material named *cellulose*—a substance which till then had been regarded as solely confined to the plant-world. It is this cellulose which, in fact, forms the greater bulk of almost all vegetable tissues. It constitutes the walls of the delicate "cells" of which plants are composed, and in its chemical nature closely resembles starch, which, as every one knows, is itself a notable product of plants.

Naturally enough, this first item in Sea-squirt history excited much curiosity as to the cause of the manufacture, by the animal, of a vegetable substance. But succeeding discoveries in the animal world revealed the occurrence of other examples of like phenomena. Thus the livers of quadrupeds are known to secrete a kind of animal-starch called *glycogen*, and other instances might be mentioned which serve to make the case of the Sea-squirts of no very exceptional kind in the modern zoologist's opinion.

Serving as a delicate inner lining to the tough, leathery coat of the Sea-squirt, we find a membrane, termed the "mantle." This latter is composed of muscular fibres, and from the action of these fibres the Sea-squirts derive their familiar name. For, when touched or irritated, jets of water are squirted out from the two orifices of the bottle-like body, by the sharp contraction of the muscular fibres of the mantle.

One of these orifices—that placed on a higher level than the other—is the mouth; the other may be named the *atrial* aperture, since it leads outwardly from a large sac, or chamber, known as the *atrial sac.* The resemblance of the Sea-squirt to the old wine-skin of Eastern nations, which was formed from the stomach of some animal, has given origin to their scientific name, *Ascidians*—the two orifices of the body roughly corresponding to the two tied extremities of the wine-skin


ASCIDIA PEDUNCULATA.

The internal structure of the Sea-squirts exhibits several features of rather curious kind, since in certain parts of their organization these molluscs differ from all other animals. The mouth thus leads into a large sac or bag, instead of into a throat as we might expect. The walls of this bag, which is the breathing-organ of the Sea-squirts, are composed of a regular network of blood-vessels, the meshes of the network being fringed with numerous minute filaments, named *cilia*, the function of which is to keep up, by their constant waving, a continuous flow of water through the breathing sac.

At the bottom of this sac the throat opens, and, as may readily be conceived, the situation of the throat admirably adapts it for the reception of the particles of food that are drawn into the breathing chamber along with the copious currents of water, which contain the oxygen gas necessary for the purification of the blood. Thus there is a constant in-draught of water into the breathing sac, and it appears that the food particles this water contains are strained off, so to speak, by means of numerous little grooves that exist in the floor of the sac, and which serve to guide the particles toward the throat; whilst a row of projecting feelers or tentacles, which line one side of the breathing chamber, may also aid in the latter function.

But a most curious part of the life of the sea-squirt consists in the mechanism whereby the water which has been used in breathing—which has given up its oxygen to purify the blood, and its food particles to nourish the body—is got rid of to make way for a fresh supply. A second sac, named the atrial chamber, has already been mentioned as lying parallel with the breathing sac. Upon the atrial chamber devolves the duty of expelling the effete water of breathing; and we may now see the use of the little filaments or cilia with which the breathing-chamber is so abundantly provided, and which thus by their constant motion create currents of water, flowing towards the atrial sac. From the latter cavity, the water is duly expelled by means of the contraction of the muscular mantle already mentioned.

As is well known, in the higher animals the heart has the double function of propelling pure blood through the body, and of sending impure or venous blood to the breathing-organs for purification. For this double purpose, a complicated heart is usually provided. But it is very curious to note that although the Sea-squirts possess a heart of a very rudimentary kind, it nevertheless perfectly performs the duties of the heart of much higher beings. The Sea-squirt's heart is a simple dilated tube, which opens at either end into blood-vessels; and when a living Sea-squirt is watched, the heart is seen to propel the blood for so many beats in one direction—say to the breathing-sac to be purified—and it may be observed next to reverse its action, and propel the blood, for an equal number of pulsations, in the opposite direction — namely, through the body.

When this natural and periodical reversion of the heart's action in the Sea-squirts was first observed, it was justly accounted a fact of very singular and anomalous nature in the history of these organisms; and it may be asserted to be without a parallel in the whole animal creation; whilst, at the same time, it shows us how admirably nature may, by an ingenious process, enable a simple organ to perform the work of more complicated machinery.

As regards sensibility to outer impressions, and the power of appreciating what is going on around them, Sea-squirts cannot be said to possess any very prominent share of instincts or intelligence. A distinct nervous system exists in these creatures, but the organs of sense appear to be limited to a few spots of pigment or coloring matter, which exist just within the mouth-opening, and to a circlet of tentacles or feelers which occupy a similar position to the masses of color. The latter are probably rudimentary eyes, and exercise an imperfect or unspecialised sense of sight, whilst a hearing-organ is also known to exist.

Certain near relations of the common Sea-squirts that swim about freely in the ocean, and which thus exhibit a higher and more active existence than our rooted stay-at-home creatures, have a more perfect development of the nervous system and organs of sense. Amongst these free-swimming Sea-squirts, none are more extraordinary than the *Salpæ*, which are met with as long chains of connected individuals, and also as single or solitary beings. And it has been found that the solitary *Salpæ* are the progeny of the chain of individuals, whilst the chain *Salpæ* in turn spring from the solitary forms. It is thus, Chamisso remarked, as if the children were always unlike the parents, but resembled their grandparents. Other compound Sea-squirts are represented by the *Pyrosomæ*, which exhibit animal phosphorescence and light up the sea at night with a weird gleam.

In the accompanying illustration, a group of "social" Sea-squirts are exhibited connected together by stalks.

Curiously enough, however, the young of the Sea-squirts begins its existence as a tadpole-like being, which is developed from the egg of the parent and adult form. This active little tadpole swims about freely by means of its long tail, and at an early stage develops suckers on its head. By means of these it ultimately fixes itself to some foreign body; the lineaments of the embryo gradually disappear, the tail drops away, and the features of the rooted, sac-like, adult sea-squirt soon become apparent. — *Cassel's Monthly.*

The New York Aquarium is already in much better condition than that of the famous Brighton Aquarium was for many months after it was opened to the public.—*N. Y. Sun.*

FISH IN FACT AND FABLE.

2.

MEDUSA.

WRITTEN EXPRESSLY FOR THE AQUARIUM JOURNAL.

Submarine life in the blue waters of the Mediterranean Sea has an interest peculiarly its own. Many of the genera and species there existing are found elsewhere more fully developed, but nowhere else do they form a uniting link between the interests of the Naturalist and those of the Traveler, the Scholar and the Poet. Twenty-five hundred years ago the great sea was the grand highway of travel for the civilized world. To the Greek poets—Homer and Hesiod, Aeschylus and Pindar—it was emphatically "*The* Sea."

At that time Science had made few researches into its living wonders, but Poetry and Religion had peopled its clear depths with a marvelous race of beings. Gods and Goddesses, Nymphs, Nereids and Sirens, were the most familiar denizens of the mighty deep, and lived in history and song, while fishes, of which doubtless many varieties were known, were of small interest, except for practical use as food.

Now, however, the descendants of these very fishes, with Testacea, Crustacea and Mollusks, crowd the waters with swarming life, and their peculiarities of structure and habits are the theme of frequent study and research, while their predecessors have faded away into the misty regions of myth and fable. Yet so inextricably is their memory interwoven with their old abodes that they have left behind them their names, borne, in many instances, by their successors, and always suggestive of the legends in which they bore their parts.

The Acalepha, lying on our beaches after storms, or floating about by thousands in our summer waters, is to us only a Jelly-fish. True, it is a curious study, with its disk shaped body, so largely made up of water that, on drying, it is reduced to a mere film of membrane; with its central mouth and its stomach, which seems to do all the work of a heart; with its beautiful colors and its numerous and exquisitely delicate tentacles. After these have become familiar, however, its attraction is gone. It is food for Fish but not for Fancy. Call it the Medusa, however, and follow it into all its various haunts along the Mediterranean shores, and the case is at once altered. The "long, vibrating tentacles" of the naturalist stretch themselves out into the hundred vipers which, tradition tells, encircled the head of Medusa, the princess and chief of the Gorgons. These Gorgons, so the story runs, were creatures with the faces of women, but covered with scales, and having tails of serpents. They had but one eye and one tooth, which were common to them all, and used by the one most needing them. They had, too, a strange and awful kind of beauty, which turned every luckless mortal who gazed upon them into stone.

Then, when Medusa is named, Perseus, her conqueror, cannot be forgotten. A gay young hero of romance—a son of the mighty Jupiter—he was beloved and favored by the Gods. Mercury gave him a sharp sword and winged feet; Pluto a helmet of darkness; and the great Minerva her own brazen shield, in whose wonderful brightness all objects shone reflected as in a mirror. Armed with these gifts, and eager to gain for himself high name and fame, Perseus set forth on an expedition against the Gorgons. In the brazen mirror he saw reflected the head of Medusa and, escaping thus its fearful spell, he cut it off and fastened it to the shell, where it still retained its old petrifying power. It was, by the way, this same "snaky-headed Gorgon shield which wise Minerva wore," of which Milton writes in his "Comus."

Entering the Mediterranean through the Straits of Gibraltar, as the English voyager would naturally do, this legend is one of the first to suggest itself. To the right, on the north-western coast of Africa, extend the plains of ancient Mauretania, the Morocco or "further-west" of the present day. Out of these fertile fields rises the stately Mount Atlas, which Virgil describes:

> "Atlas,
> Whose brawny back supports the starry skies;—
> Atlas, whose head with piny forests crowned,
> Is beaten by the winds, with foggy vapors bound.
> Snows hide his shoulders—from beneath his chin
> The founts of rolling streams their race begin."

It is evident that the poet sings not merely of a mighty mound of earth. A glimpse of its lofty, snow-crowned summit, brings to his memory the Grecian myth. He tells of the Atlas who, in days of old, was a proud and powerful king. Chief among his treasures were gardens having golden trees bearing golden fruit half hidden by golden leaves. Perseus, bearing the magic shield, entered his domains and, announcing himself as the son of Jupiter and the conqueror of Medusa, demands recognition at court. More modesty might have gained him a warmer welcome. Atlas, it happened, had been forewarned that by a son of Jupiter his precious golden fruit would be stolen away. Remembering this warning he harshly refused Perseus any of the rites of hospitality. The hero was naturally indignant at this treatment, and gave it swift and fearful punishment. He raised the awful shield, and one glance at the snake-encircled head of Medusa changed the haughty monarch into a rugged mountain, doomed forever to bear upon its summit the heavens and all the stars.

> Each brook once wont to prattle to its banks,
> Lay all instilled and wedged betwixt its banks,
> Nor moved the withered reeds.
> The surges, baited by the fierce north-east,
> Tossing with fretful spleen their angry heads,
> E'en in the foam of all their madness, struck
> To monumental ice. Such execution—
> So stern, so sudden—wrought the grisly aspect
> Of terrible Medusa.
> And, fixed in that fierce attitude, he stands
> Like Rage in marble.

Leaving the unhappy monarch to his melancholy fate, memory busies itself with yet one more link in the chain of old romance, which twines itself about the new Medusa of the Mediterranean. Perseus pursued his journey and, like the Knights of the Round Table, rescued many forlorn damsels from distress,—last and most hapless of them all, the fair Andromeda. Her mother, the "starred Ethiop queen," had dared to affirm that her beauty was more dazzling than that of the sea nymphs. Upon this insult they seized the unoffending Andromeda and bound her to a rock to be devoured by a huge and voracious sea monster. Perseus saw and loved her; for her sake slew the monster, and was about joyfully to wed his rescued bride. Suddenly, however, Phineus came upon the scene and declared that Andromeda had been betrothed to him. He was asked, with some acuteness, why he had not appeared to claim her when she lay bound, a prey to a hideous foe. His answer was to hurl his dart at Perseus. It missed its aim. Then he and his comrades rushed into a deadly fray. They beset Perseus and would have slain him when, on a sudden, he raised once more the mighty shield. The silence of death fell around him. His foes were motionless monuments of stone, fresh victims of the terrible Medusa head, and Andromeda was safely his own.

These fragments of the Greek mythology connect themselves with only one species of aquatic life. There are many such species in the Mediterranean and many such quaint old myths, dear to the heart of the poet. In the light of these facts it is that the peculiar interest, already spoken of, still exists—an interest unscientific, perhaps, but alive to memory and imagination.

Joanna S. Nichols.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

Well, my young friends, the time has come for your Uncle Octopus to tell who has received the prizes for the best compositions on whales. First of all he would say that he has received a great many answers and all of them are good. But you know that all could not have prizes, and so those who have not got them must try again when the next is to be given.

And now your Uncle has a secret to tell you, and when it is done perhaps those who have not received prizes will not think he is unkind. The truth is your Uncle is a *bachelor*, and so not being used to read boys' and girls' compositions he concluded to let a relative of his, who has a boy of his own, tell which should have the prize. This has been done, and the compositions which were judged the best are given in the next two columns. The first two, by MISS FRANCES HAESELBARTH and MISS ALICE SUTRO, are to be rewarded by Fish Globes, and the other three, by MASTERS BRINTON, TOWNSEND and PALMER, will receive the Books.

The Globes will be ready, with a card on them, at the Aquarium, to be sent or called for; and the Books will be sent by mail.

I do not mean to say that all of these compositions are just right, for you will see yourself that some of them have some queer mistakes. But if every boy and girl in the land knew everything it would be rather hard for the old folks. Your Uncle finds that he has not room to tell all the reasons why these were considered the best, but will say that the choice was made for many reasons, and you must try and be satisfied, and those who lost must try again.

On the page after this you will find a jolly piece of poetry which was really intended for the children, but which was placed on the old folks' page because there was no room for it in the children's column. Perhaps when you are reading that you will wonder what kind of a fish a Miller's Thumb is. Well, try and find out and tell us about it.

UNCLE OCTOPUS.

WHALES.

DEAR UNCLE OCTOPUS:

I read last night in your pretty paper that father brought home, your offer to all little children who would write you a story about Whales, so I thought I would try, and although I have never seen a live Whale, yet I will tell all I have read about them. Whales are the largest sea monsters there are. We cannot call them fish, because they are warm-blooded and cannot always live under water. They can stay under water half an hour at a time. Whales live in the Polar Seas and are much sought after on account of the oil and whalebone obtained from them. The oil comes from a fatty substance called blubber, which lies under the skin, and the whalebone comes from the roof of the mouth of the huge creature. When a whale wants his dinner he opens his mouth wide and rushes through the water, taking in a great crowd of little fish and sea animals, and a great deal of the salty ocean. The last he does not want so he sends it out in a stream, and holds only the poor little fishes in his mighty jaw. Many ships go out every year after Whales, and when it comes to the top of the sea and throws forth its column of steam and water they see the creature and start immediately in their boats to catch it. Sometimes they are successful, but very often the Whale is angry and upsets the boats or drags them down and drowns the sailors. To kill the Whale the men throw a harpoon, to which is fastened a long line, into his body, and then let it swim until it dies from loss of blood, when they tow it to the ship. I have read that Whales show great love to their young, and when danger is near they place their children under their flippers and carry them down deep into the water. Whales are sixty feet long. And now, dear Uncle Octopus, I suppose you would like to give me a Whal-ing for sending you such a foolish letter. I dare say I deserve one, but I do so want one of those globes of fishes. Yours,

FRANCES C. A. HAESELBARTH.

Nyack, Rockland Co., N. Y.

The Whale is the largest fish in the world. It is found in the sea; it lives in a very cold country; it has a very large mouth and small eyes; it has also a broad, flat tail, which it uses to guide its course as it swims through the water; it has a small hole in its head from which it squirts water like a fountain, and very high; the cause of it squirting this water is this: when the Whale comes up from the bottom of the sea to take breath, the water goes into its mouth and then it squirts it out of this hole. The whale is a valuable fish. From the whale we get oil, which is very useful; we also get whalebone from which we make corsets, umbrellas, &c. Now I will tell how they catch the Whale. A number of men go out in a boat, and when they see a Whale one of the men stands up with a spear in his hand, while the rest of them row up to the Whale; then the man with the spear in his hand will stick it into the Whale; then they will fasten a rope to the spear and then the other men will row to the shore; but sometimes the Whale will swim away and pull the boat with him. The Whale has such a big mouth that when he can get a chance he will swallow the men. The whale, while swimming along, will flap his tail up and down in the water and make a great splash. In winter when the men are catching the whale he will pull the boat under the ice and then the poor men will be drowned.

ALICE SUTRO, Age 10 Years.

157 East 47th Street.

There are four kinds of whales. The Sperm or Spermaceti Whale, that has the spermaciti in its head; the Right Whale, that has the oil. It is so strong that an ordinary one not over sixty or seventy feet long can pull six or seven boats at one time with the harpoons in him. The Little White Whale that is not over six or eight yards in length, which has the valuable skin; the Razorback which has on its back a kind of knife with which it fights. Its longest length is one hundred and five feet. It is no good. The tongue of the largest Whale weighs fifteen hundred pounds. It is nothing but fat. The boats which they catch them with are pointed at both ends so that they can change their course easily. There is in the boat a kind of tub in which a rope is wound with one end attached to a harpoon. When the whale comes near enough, the man with the harpoon darts it into him and as he goes down in the water, the rope unwinds, but if it is too short, the whale pulls the boat down and they have to cut it off. Sometimes the Whale pulls the rope so fast that the friction causes it to take fire and sometimes burns the boat up. After they have killed the Whale, particularly the Sperm Whale, it often sinks and they have to cut the rope off. After they have killed the Whale, they fasten it to the side of the ship and cut it up and take out the blubber and hoist it on deck and melt it and the oil is madet The best oil comes from the Right Whale. Almos all this I learned at the Centennial.

Philadelphia. GEORGE BRINTON.

A Whale has a tremendous head, and the great Northern Whale gives a large quantity of oil—usually a hundred and twenty tons, and gives a great deal of black whalebone. It eats very small things, though you would think such a large animal would eat larger things. It used to venture in our seas but now it is so timid that it goes away up North, and they are daily getting fewer. Mollusks attach themselves to the skin of the Whale, and brood there as if it was a rock. The Whale could upset ships with a single blow of his tail. The great Northern Whale usually grows to seventy feet. A fleet of vessels go out at once with harpoons and harpoon the Whale. My grandma, who is nearly eighty years old, told me this story: A Whale was found dead in New York harbor, and some fishermen rowed out and towed him to the shore. They put a fence around him and charged a shilling for a look at him. The people that looked at the Whale when they came home had to hang their clothes out for the fishy smell stayed in them. You can't see a whale's teeth; they are so small that they do not cut the gum. Wasn't Jonah lucky.

C. W. C. TOWNSEND.

Plainfield, N. J.

The whale is the largest animal in the ocean. It is not a fish, although many ignorant people suppose it is. There are a great many varieties, so many that I have not room or time to describe them all, but I will mention some of their names. The Balæna Whales, the Sperm and the Dolphins. They mostly live in arctic and antarctic regions. They are hunted for their oil and bones. The common Dolphin is vulgarly called the "goose of the sea." It was the favorite of Apollo and is seen on very ancient coins and medals. The White whale is a very swift dolphin, of a beautiful cream-white color. It lives in the arctic regions, but has been seen in the St. Lawrence River as high up as Quebec. It lives on flounders and other small fish. A white whale was once tamed in Boston so that it would eat from its keeper's hand, and draw a shell-like boat around an aquarial tank. Last Saturday, Nov. 11th, I visited the Aquarium, at 35th Street, where I saw the wonderful White Whale. I found I had the best view of him from the bridge. He seemed to enjoy himself diving and swimming about. Hope he will not die before I get a chance to see him again. I have often wondered what kind of a whale it could have been that swallowed Jonah. Probably he was one of the largest, which are from sixty to seventy feet long. Who can tell?

F. HERBERT PALMER.

105 West 42d Street, N. Y.

W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL.

W. S. WARD, Editor.

NEW YORK, DECEMBER 6, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

The progress which has been made in the purifying and clearing of the water in the tanks of the Aquarium is so marked and gratifying as to prove a cause for congratulation. Those not familiar with the true character of the problem now successfully solved, may not be aware that it is one of the most vexatious and perplexing of the manager's trials. Take the purest water from mid-ocean and expose it to the light of an Aquarium tank and it soon loses its clearness, becoming opaque and clouded. When the cause for this is sought it is oftenest found in the existence of myriads of minute vegetable organisms, too small to be defined, yet, when massed, sufficient to cloud the water and materially interfere with the exhibition of the tank's contents. The removal or destruction of these germs becomes, therefore, a most important problem, and hence the methods proposed for its accomplishment are many and varied. As the result of continued experiment, however, it has finally been settled that the destruction of the germ is best effected by its exposure to the air, or by bringing it in contact with air currents, and then by keeping the water enveloped in darkness. To effect the latter the great concealed receiving and storage reservoirs are constructed, while the system of circulation is depended upon for the oxydizing of the organic particles and the consequent destruction of their vitality.

In order to comprehend the subject, let it be supposed that the exhibition tanks are filled with water which, owing to its needed exposure to the light, has become clouded by reason of these minute vegetable organisms. At a distance from the tanks, and beyond the reach of the sun's rays, are the great reservoirs. When the circulating system is in active operation the water from the tanks overflows and runs back into the dark reservoirs; here, owing to the absence of the sunlight, the growth of the germ is checked. Soon, however, the water is caused to start on its round again, first being drawn into the pumps, from which it is forced along the distributing mains till, at stated intervals, it is injected into the tanks in fine streams. These streams, falling some distance through the air, expose the water and the vegetable germs to its action. This exposure results in an oxydation of the organic matter, which is therefore so changed in character as to be less harmful. By a continued repetition of this circuit the water is eventually rendered perfectly clear, and by no other means can it be effected.

We have been prompted to thus briefly refer to this subject, owing to the frequent inquiry addressed to us as to the cause of this opacity in the water, and the chance of its ultimate removal. Soon there will be no occasion for inquiry, as the defect which suggests it will be absent. In the meantime the intelligent visitor to the Aquarium should have his interest heightened rather than diminished, since he may watch, from day to day, the improvement in the water that is brought about by such a simple and yet mysterious chemical reaction.

* * *

In accordance with a determined purpose to render the Aquarium and its *Journal* an object of special interest to the young, we have instituted a series of competitive tests, to be rewarded by prizes, which are to be granted to those of our young readers who will furnish "compositions" on the subjects named. The result of the first contest appears on the children's page, and to the contents of this department we heartily commend the attention of our older patrons.

Our first impulse was to devote the whole of the present issue to the publication of these youthful essays, for there was not one of the many answers received which did not contain some feature of peculiar interest. An incident given in one of them on the authority of the writer's grandmamma, is of a nature to merit attention from others whose memory may serve to endorse the truth of the statement. We refer to the story of the whale which once appeared in New York Harbor. If any reader has more full and satisfactory information regarding this event we should be pleased to receive it.

Lest our readers should be led to suppose that it is intended to devote a full page of each number of the *Journal* to the exhibit of the ground plan as shown on the following page, we would state that its reproduction will be limited to the present number.

Preparations are making to render the Christmas number of the *Journal* one of special interest, and during the coming year the columns of the *Journal* will contain, as heretofore, such articles, original and selected, as shall be deemed of special interest to those engaged in the study of Natural History. Several contributors of established reputation in this department have been engaged to aid in this work and, as in the management of the Aquarium itself, the *Journal* will be so conducted as to commend it to the patronage of all who are in sympathy with its purpose and aim.

OUR GROUND PLAN.

In presenting to our readers the ground plan of the Aquarium, it is done mainly with the purpose of indicating the extent and complications of the distributing systems. Already, in the first number of the *Journal*, an extended description of the method of æration was given, and to this we refer for the details of the work.

* * *

WASN'T HE SILLY?

BY MADGE ELLIOT.

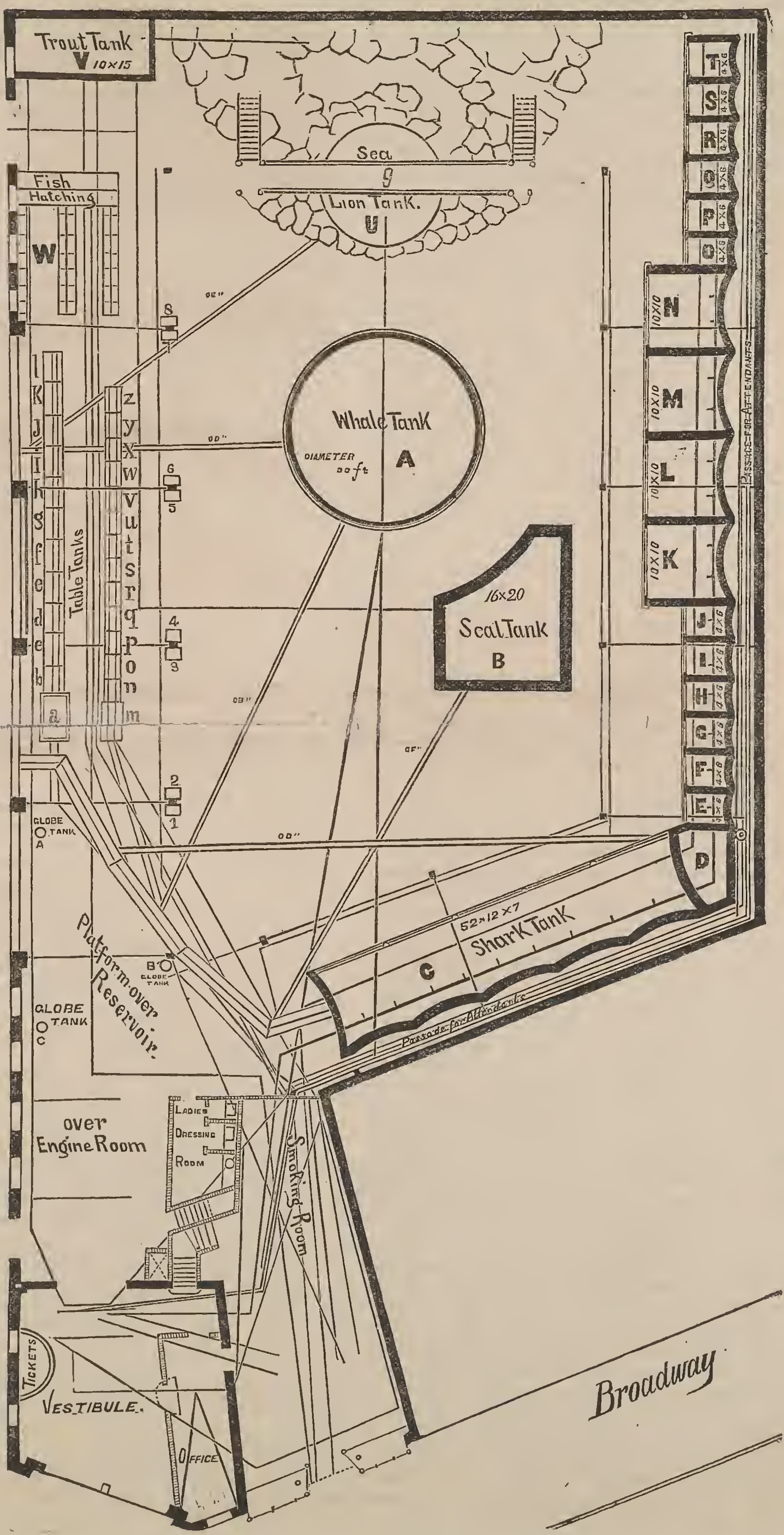
A Miller's Thumb came out one day—out of the water,
To visit Madame Scollop and her very charming daughter.
"How well you look, dear Madames, your shell's the height of fashion;
For plaits and frills, and ruffs, I'm told, just now there's quite a passion"—

But he'd no farther got than this, when goodness! what a racket,
And something came along the shore whose shell they call a jacket.
"A Boy!" cried young Miss Scollop, "Oh! hide fish or you'll be worried,"
And in the sand she and her ma themselves soon safely buried.

"He won't find me," said friend M. T., his M T head concealing
Beneath a stone, while, silly fish, his whereabouts revealing—
His tail flapped wildly in the air. "Ha! ha! ho! ho! my hearty,"
As it he slyly grasped, the boy cried out "no swimming party

From this time forth will you attend, for I'm a going to take you
Straight home with me—don't wriggle so—and there I'll fry or bake you."
"Alas! alas!" wept Miller's Thumb, "farewell my native water,
Farewell dear Madame Scollop and dear Madame Scollop's daughter.

We'll meet no more, in sea, on shore. How *did* that monster find me?
My head was hid—he must have seen the tail I left behind me."
Oh! finny tribe a warning take, and mind you don't forget it,
Whene'er you hide let not your tail tell tales or you'll regret it.



GROUND PLAN

OF THE

MAIN PAVILION

OF THE

New York

AQUARIUM

Cor. 35th Street & Broadway,

SHOWING THE

POSITION AND RELATIVE SIZE

OF THE

MARINE & FRESH WATER TANKS

THE

Sea Lion Rockery,

THE

HATCHING TROUGHS

AND THE

TABLE TANKS

TOGETHER WITH

A Full Exhibit

OF THE

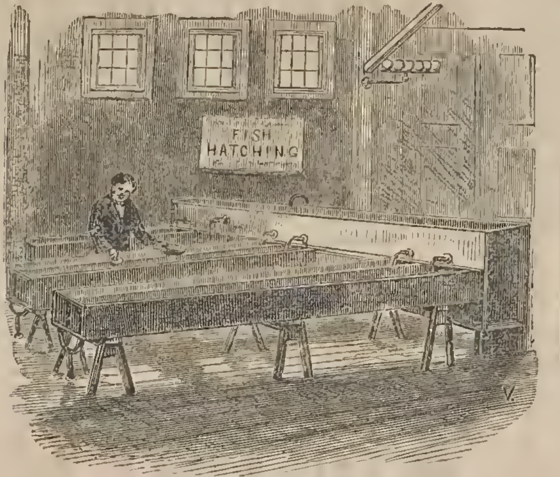
Numberless Water Pipes

And their Connections,

Through which the Fresh and Salt Water is distributed to the Tanks or returned to the Reservoirs.

For a complete Index to the Contents of the Tanks, see the LAST PAGE of the *Journal.*

W. C. COUP, Manager.



FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Two of the troughs are now filled with young of the California Salmon from three to five weeks old which were hatched where they now lie, from eggs which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalists the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

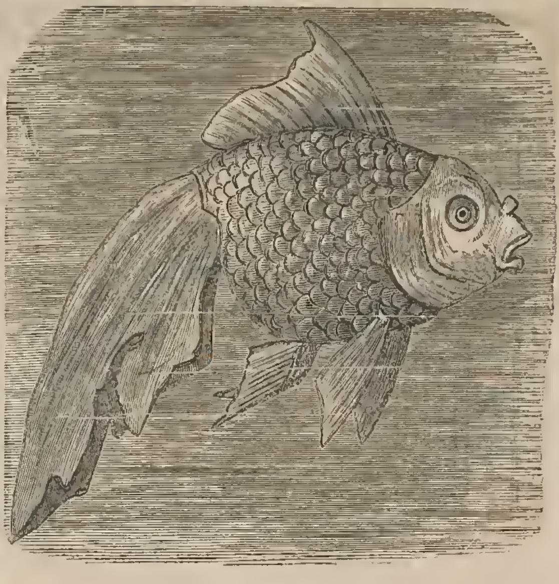
The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, according to the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Another trough contains 25,000 eggs of the Lake Whitefish, and 15,000 eggs of the Cisco or fresh water Herring, which were presented by Mr. Geo. Clark, one of the Michigan Fish Commissioners, and a recent addition of the eggs of Whitefish, Lake, and Brook trout from Mr. Seth Green, Superintendent of Fisheries for New York, has been made, to be followed in February by the Land Locked Salmon from Maine the gift of Prof. Baird, these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.

It is expected that Salmon will be ready to take food at about six weeks old when the sac will have been entirely absorbed, they will then be in condition to find their own living in the streams if put in such spring creeks as are chosen by the parent fish as a place of deposit for the eggs.



JAPANESE KINGIYO.

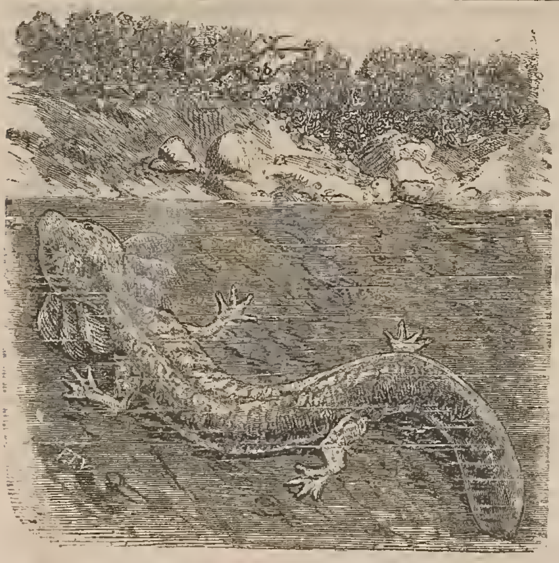
The presence in the Aquarium of this wonderfully beautiful, and strangely grotesque fish, should be a cause for special congratulation. The specimen exhibited in table tank p, of the fresh water series, was brought from Japan by a gentleman who has furnished the following interesting facts regarding it:

Starting from Japan with eighty-eight, he arrived in Baltimore with but seven, all of which are now alive and in good health. The captain of the steamer taking great interest in his efforts to introduce the fish to America, built a tank on the steamer to accommodate them, and took in a supply of river water; but it was soon found that the motion of the ship dashed the fish against the sides of the tank and many were lost. To obviate this a smaller tank was built and suspended like the compass, which counteracted the motion of the ship; but notwithstanding all the care bestowed on them only fifteen arrived in San Francisco, all in a very weak condition. Of these eight subsequently died.

The Japanese claim that the brilliant colors displayed in this fish, and the wonderful development of its triple tail, is the result of many years careful breeding. This one is an unusually fine specimen. In Baltimore great care was taken of the seven survivors, and during the summer they spawned, the result being about fifty young fry, which exhibit all the peculiarities of the originals. It is the intention of the owner when he has a sufficient stock, to donate them among persons who will take an interest in them and carefully raise them.

For the benefit of any of our readers who have not as yet been able to visit the Aquarium, we would state that in outline and general appearance the above illustration, drawn from life by Mr. Vance, is exact and truthful in every particular. The body is red in color, similar to that of a brilliantly-hued gold fish; the tail, however, is a pearly white, and as it rests in the water presents the appearance of a fine, silken fabric, terminating in a delicate fringe. In addition to the peculiar attraction which the form of the fish is to the general observer, the naturalist will find in its very existence and the tradition regarding its origin theme for thoughtful study.

If the Chinese can accomplish such results in the modification of special features, by aid of their crude appliances, there is every reason to believe that, with our more complete arrangements, still more marvelous results may be obtained. At least the attempt is to be made, and already the naturalist of the Aquarium has taken measures to apply and test the Chinese methods with the hope that still more valuable results may be secured. A careful record of these experiments shall be kept, and at a future day we shall hope to present to our readers, and exhibit to the public, specimens of fish, the results of special culture, which will rival in interest the oriental beauty now on exhibition.



THE BANDED PROTEUS.

Menobranchus Lateralis.

The Banded Proteus now to be seen in table tank w of the fresh water series, is one of the most curious and interesting of aquatic animals. As the visitor to the Aquarium will be able to observe its peculiarities of form and structure, no extended description of them is needed. It will be well, however, to direct attention to the peculiar form of the gills, there being three on each side, ramified and fringed, and of a red color, on account of the blood which circulates through them. Dr. Beall invented an ingenious arrangement by which this phenomenon of circulation could be witnessed. The blood dics are of so extraordinary a size that they can be distinguished by an ordinary pocket magnifier while passing through the vessels.

The Banded Proteus is found in Lake Champlain and at the outlet of Lake George. It is also to be found in certain of our Northern and inland lakes, where its presence is a bane to the fishermen, since it has a peculiar fondness for the spawns of the white fish. Its movements in the water are usually slow, but, from the size of its tail, it is evident that when occasion demands it can move with great speed. They are said occasionally to come upon the land. Its color is brownish with blackish spots, and its length varies from one to two feet.

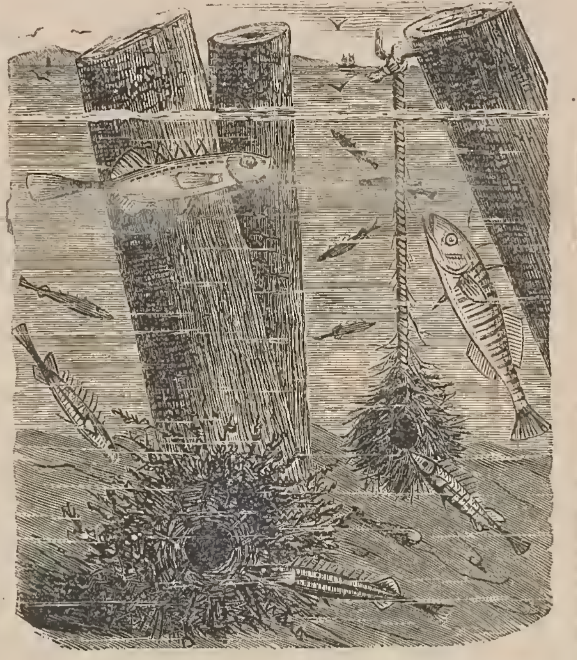
Wood, writing of the *proteus anguinus*, states that at the duchy of Carmiola is a most wonderful cavern, called the grotto of the Maddalina extending many hundred feet below the surface of the earth, and consequently buried in the profoundest darkness. In this cavern exists a little lake, roofed with stalactites surrounded with masses of rock and floored with a bed of soft mud, upon which the Proteus may be seen crawling uneasily, as if endeavoring to avoid the unwelcome light by which its presence is known. These creatures are not always to be found in the lake, though after heavy rains they are tolerably abundant.

The same writer adds that the discovery of this animal is extremely valuable, not only as an aid to the science of comparative anatomy, but as affording another instance of the strange and wondrous forms of animal life which still survive in hidden and unvisited nooks of the earth. For several of the specimens now on exhibition our acknowledgements are due to Prof. **Birt. G. Wilder** of Cornell University.

COMMON STICKLEBACK.

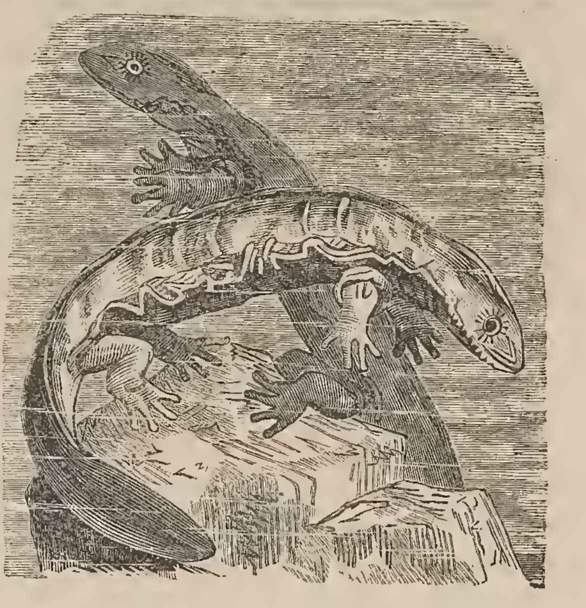
Gasterosteus Pungitius.

This well-known fish is found in ponds, streams, and rivers, and appears equally suited to salt water, and belongs to the order of spine-finned fishes known scientifically as Acanthopterygii. It is extremely voracious. An observer, once standing by the side of an ornamental lake, saw a young frog hopping past. He threw it in a short distance to exhibit its powers of swimming to a young bather, anxious to learn the art. The moment it reached the surface of the water, a flash of light seemed to be emitted from the bottom. It was caused by a shoal of Sticklebacks, which pounced upon the unfortunate frog with great fierceness. In a few moments the four legs of the poor creature were eaten away, and new shoals came hurrying from more distant parts of the lake to the prey. The battle that took place round the victim was as desperate as could be imagined. Though pelted at with bits of gravel, they would not leave it, but continued to nibble and battle among themselves as long as a particle remained. This instance of voracity is, however, not surprising, for they do not hesitate to devour one another.



The peculiarity of the Stickleback which, however, commands the special attention of the naturalist, is its expertness as a nest-builder. In the first number of the *Aquarium Journal* an extended description of the methods employed by these fish in the construction of their marine homes was published. The illustration here given shows the form of the nest, and also depicts the ingenuity of the little builders in the choice of a location. Here it will be seen that one has chosen the end of a rope as the site of his home, and by the aid of his mouth alone has converted it into a nest. A number of these graceful and ingenious little creatures may now be seen in post tank 9.

In addition to its instinctive skill and intelligence the Stickleback, it is claimed, may be trained and instructed by man. As illustrating this Prof. **Butler**, the Superintendent of the Aquarium, states that he has been able, by the aid of an ingenious but simple device, to teach his Sticklebacks to ring a bell when they wanted food. The bell was suspended above the tank, and the connecting rope, a fine thread, having been baited was lowered into the tank below. The nibbling of the bait rang the bell. Care having been taken to add fresh bait whenever the cord was pulled, the little Sticklebacks soon learned to summon their attendant by this means.



THE ALLEGHANY HELL-BENDER.

Menopoma Alleghaniensis.

The interest which attaches itself to the series of fresh water tanks at the Aquarium is mainly divided at present between the Proteus as seen in tank w, and the subject of the present sketch. As its name indicates, the Hell-bender is found in the Alleghany river and other tributaries of the Ohio. It is also known as the Salamander of the Alleghanies. The specimens shown in tank r were presented to the Aquarium by the Buffalo Society of Natural Sciences, through its Secretary, Mr. A. R. **Grote**, who also read an interesting paper on the subject before the American Academy at its last meeting. This gentleman also records, in the *American Journal of Science*, the interesting fact that this animal sheds a transparent membrane, which he believes to be the exterior layer of the skin. While observing one in the Aquarium of the Buffalo Society of Natural Sciences, an almost complete skin, all the feet and toes being readily perceived, was seen floating in the water, and later the creature was discovered in the act of swallowing his former covering, a practice which has also been observed in the toad. In a recent communication Mr. **Grote** describes this operation of shedding the skin, from which we learn that this thin and transparent membrane is first seen to loosen and separate from the entire surface of the body, appearing at this stage like an envelope or glove in which the animal is contained. By a number of wide gapings, during which the mouth is opened to the fullest extent, the skin is parted about the lips, and then commences to fold backward from the head. Convulsive and undulating movements with the body and fore legs are employed to extract these from the loose skin. The skin then readily falls backward, as the animal crawls forward and out of it, until the hind legs are reached, when the menopoma turns round upon itself, and, taking the skin in its mouth, pulls it over the legs and tail. The operation reminds one of taking off clothes. The cast off skin is retained in the mouth and finally swallowed. The operation is quickly performed. The visitor who watches the menopoma, will observe a swaying motion of the body; this action is not yet fully accounted for, though it is possible that it is connected with the animal's desire to rid himself of his ugly skin.

A female Hell-bender opened on the 21st of August contained well developed eggs attached by a membrane to the oviary. These eggs are laid in a connected string, and are deposited along the muddy banks of the river.

The two specimens of Hell-benders now on view are worthy of special study, and, as in many other cases, we would advise those interested to view them as soon as possible, as already the confinement of the Aquarium has resulted in the death of one rare creature of this class.

THE AQUARIUM GUIDE.

The following tabulated list is designed, with the assistance of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER SERIES.

Tank A—Whale.

Tank B—Seals.

Tank C—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Prickly Skate, Summer Skate, Sand Shark, Smooth Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog.

Tank E—Striped Bass, Weak Fish, Codlings, Flounders.

Tank F—Five varieties of Star Fish.

Tank G—Lobsters

FRESH WATER SERIES.

Tank H—California Salmon, Lake Trout, Brook Trout.

Tank I—Yellow Perch, Brook Pickerel. Blue Cat-fish, Long-eared Pond fish, common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass.

Tank J—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank K—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Water Sheepshead, Long finned Chub Sucker, Wall-eyed Pike, Lake Pickerel.

SALT WATER SERIES.

Tank L—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank M—Lafayette Fish, Flounder, Porgies, Young Skate, Black fish, Striped Bass. Cod.

Tank N—Tomcod, Blackfish, Striped Bass, Manhaden, Lafayette, King Crab.

Tank O—Killi-fish, Tomcod, Toad Fish.

Tank P—Lobster, Lady-crab; Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank Q—Spotted Cod Lings.

Tank R—Rock Cod.

Tank S—Black Sea Bass.

Tank T—Lobster, Striped Bass, Porgies, Lafayette Fish.

SALT WATER TABLE TANKS.

Tank a—Anemones.

Tank b—Porgies, Pectens.

Tank c—Striped Gurnards, Barred Killifish, Algae, Toad Fish, Smooth browed Bull Head.

Tank d—Sea Raven, Bermuda Lobsters, Lady Crabs, Spider Crabs, Rock Crabs, Winter Flounder, Pectens, Sheepshead Lebias, Algae, Sea Urchins.

Tank e—Wharf fish, or Cheesey Black fish, Spider Crab, Pectens, Lebias, Algae, Young Tantog or Blackfish, Cunner, Sea Urchins.

Tank f—Harvest fish, Star fish, four varieties, Hermit Crabs, Pectens, Algae.

Tank g—Serpula, Living Sponges, Aromias, Bryozoas.

Tank h—Anemones, four varieties, Algae, Living Corals.

Tank i—Crabs, 7 varieties, Algae, Shrimp.

Tank j—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Shrimp, Algae, Young of edible Crabs, Fiddler Crabs.

Tank k—Lafayettes, Algae, Sheepshead Lebias, Little Hermits.

Tank l—Sea Horse, Sheepshead Lebias, Algae, Serpula, Periwinkle and Spawn.

FRESH WATER TABLE TANKS.

Tank m—N. Y. Shiner.

Tank n—Brown Cat fish.

Tank o—Pickerel.

Tank p—Japanese Kingiyo.*

Tank q—Common Sun fish.

Tank r—Hell Benders.*

Tank s—Long eared Pond fish, and Fresh Water Lobster.

Tank t—Common Pond Fish.

Tank u—White Perch.

Tank v—School of black-nosed Dace.

Tank w—Banded Proteus.*

Tank x—Yellow Perch.

Tank y—Young Brook Trout.

Tank z—Lake Trout.

POST TANKS.

Tank 1—Young Salt Water Actinae, Coral, Algae.

Tank 2—Black Headed Dace.

Tank 3—Crimson Spotted Triton.

Tank 4—Fresh water Lobster, Dace, Algae.

Tank 5—Algae, Unic, Munnon.

Tank 6—Dace.

Tank 7—Young Cat Fish, Lobster, etc.

Tank 8—Sea Anemones; Algae.

Tank 9—Sticklebacks.*

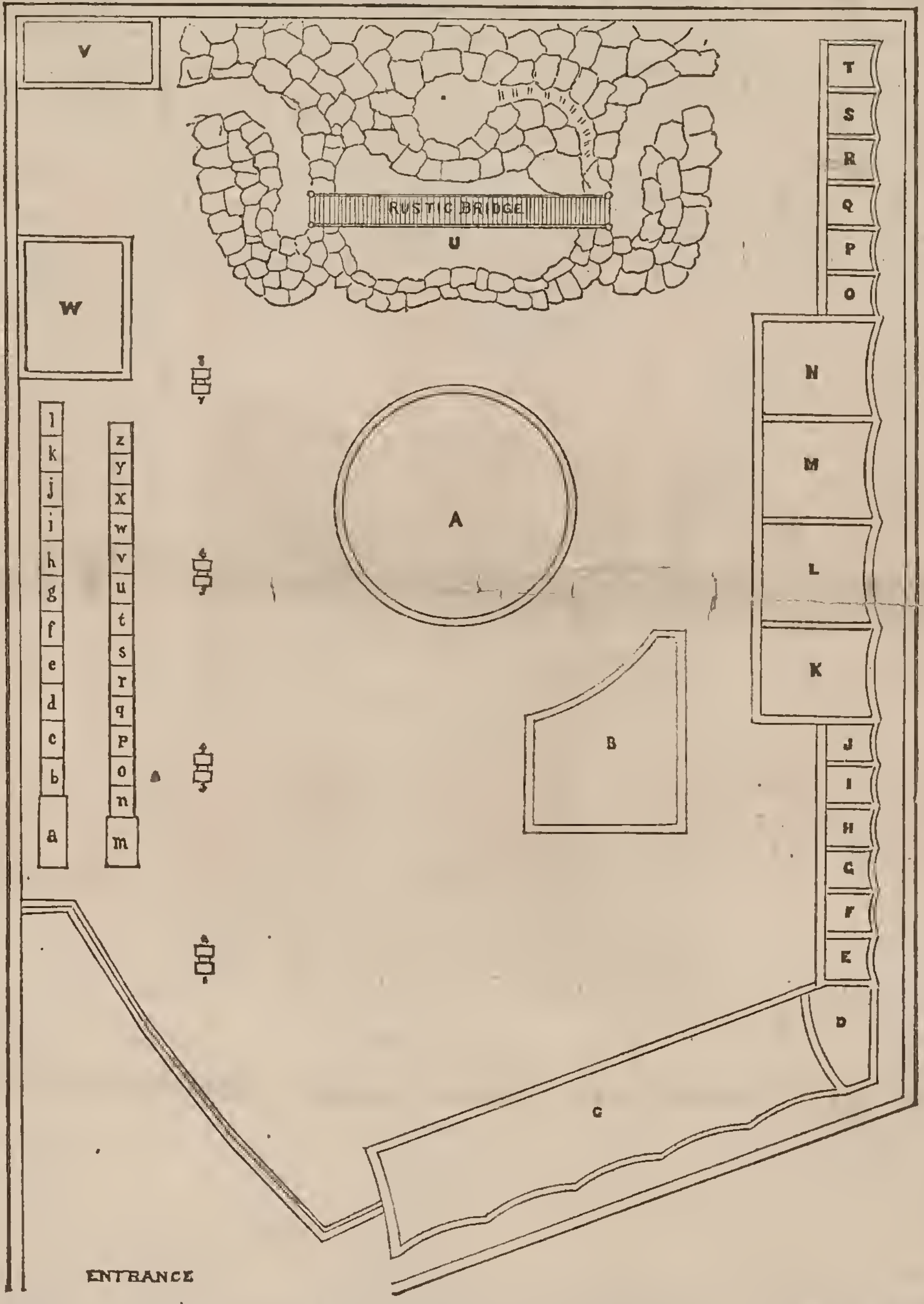
Tank U—Sea Lion.

Tank V—Brook Trout, Salmon Trout, California Salmon

Tank W—Fish hatching troughs.*

***The Asterisks that follow many of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on pages 38 and 39 of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions.

The manager is pleased to announce that he has just received from Mr. Seth Green, the following supply of fish and fish spawn; Salmon and Brook Trout with spawn of the same, and California and Kennebec Salmon of different ages, and in addition a full supply of Whitefish spawn. The spawn above mentioned has been placed in charge of Mr. Mather.



Ground Plan of the New York Aquarium.

* * *

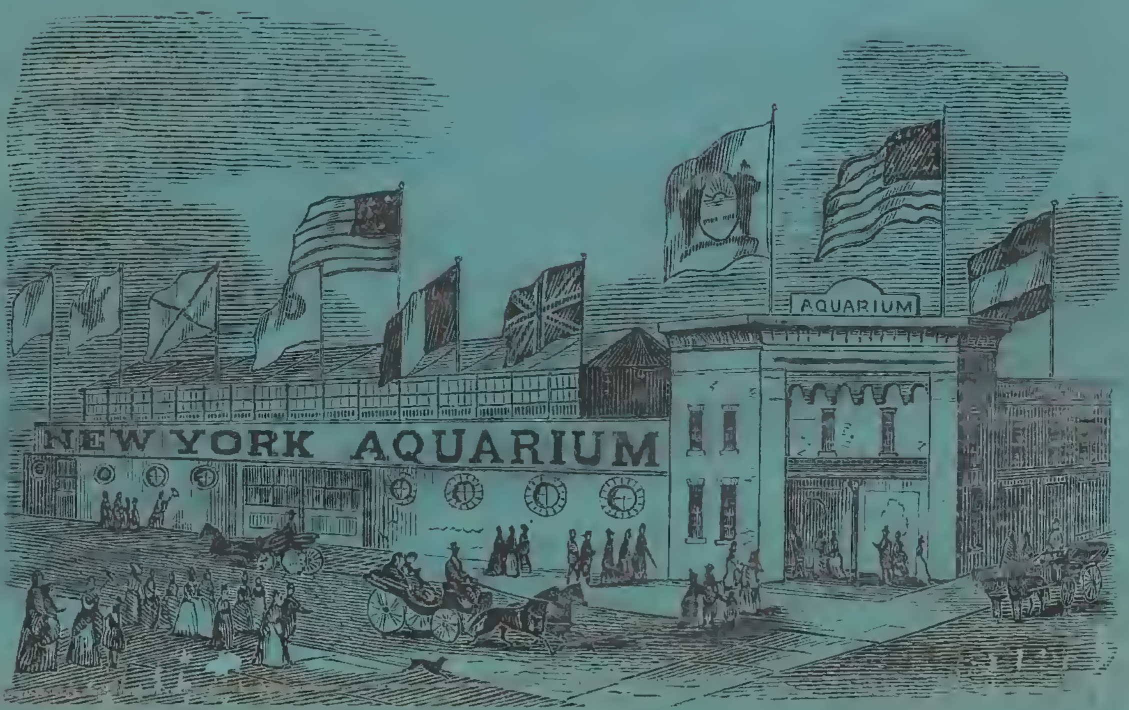
The official direction and management of the Aquarium may be indicated as follows:

W. C. COUP	Manager.
R. J. EDGAR	Secretary
PROF. H. D. BUTLER	Gen'l Sup't.
MR. W. S. WARD	Naturalist.
	And Director of Educational Department.
C. F. HOLDER	Assistant Naturalist.
MR. FRED. MATHER	Sup't of Fish Culture.
MR. A. W. ROBERTS	In charge of Fisheries.
F. T. VANCE	Illustrative Artist.

CHRISTMAS NUMBER.

W. C. COUP & REICHE BRO'S

New York Aquarium



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(ILLUSTRATED.)

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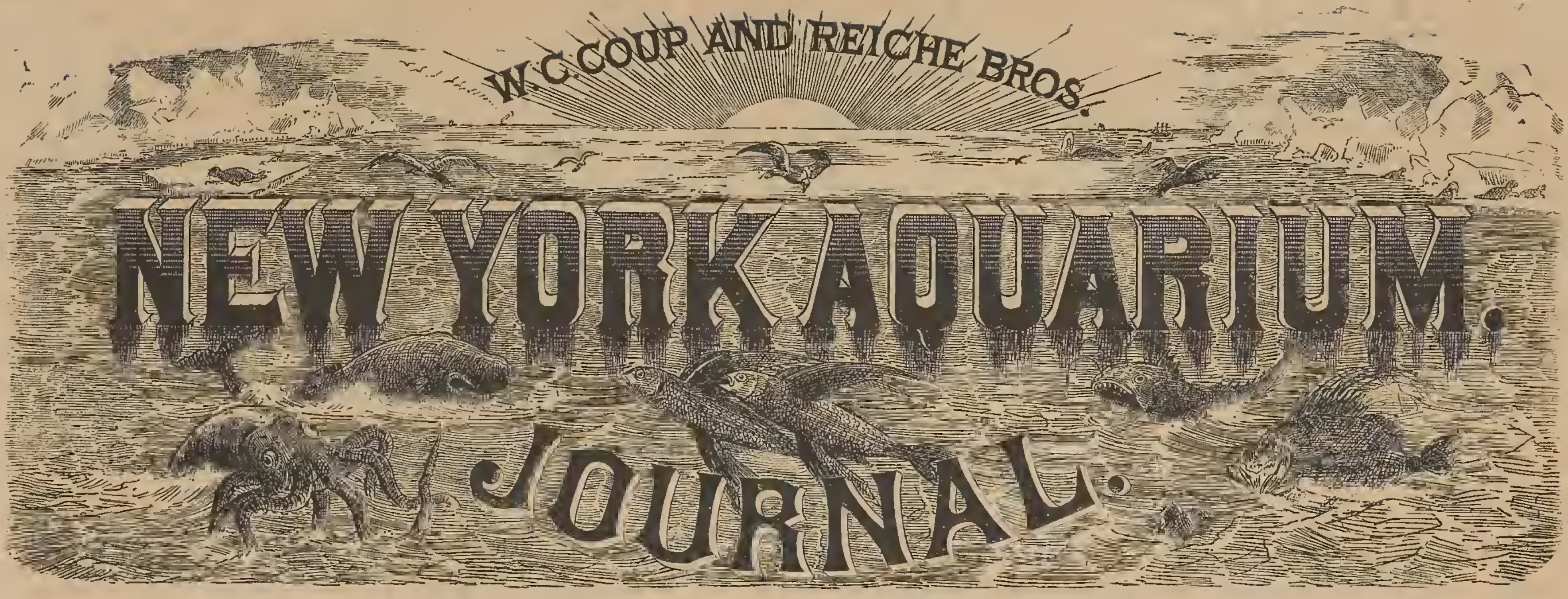
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NEW YORK AQUARIUM JOURNAL.

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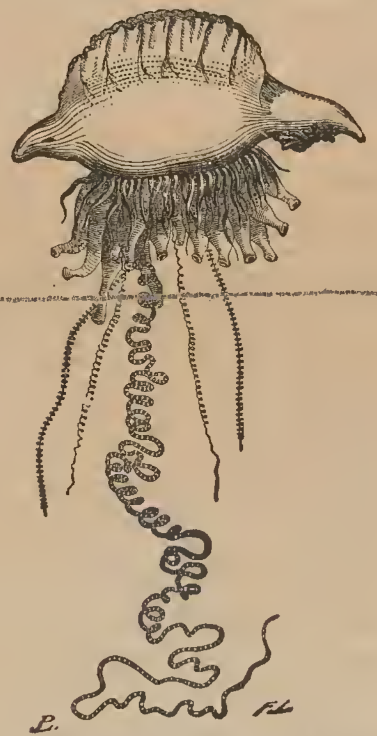
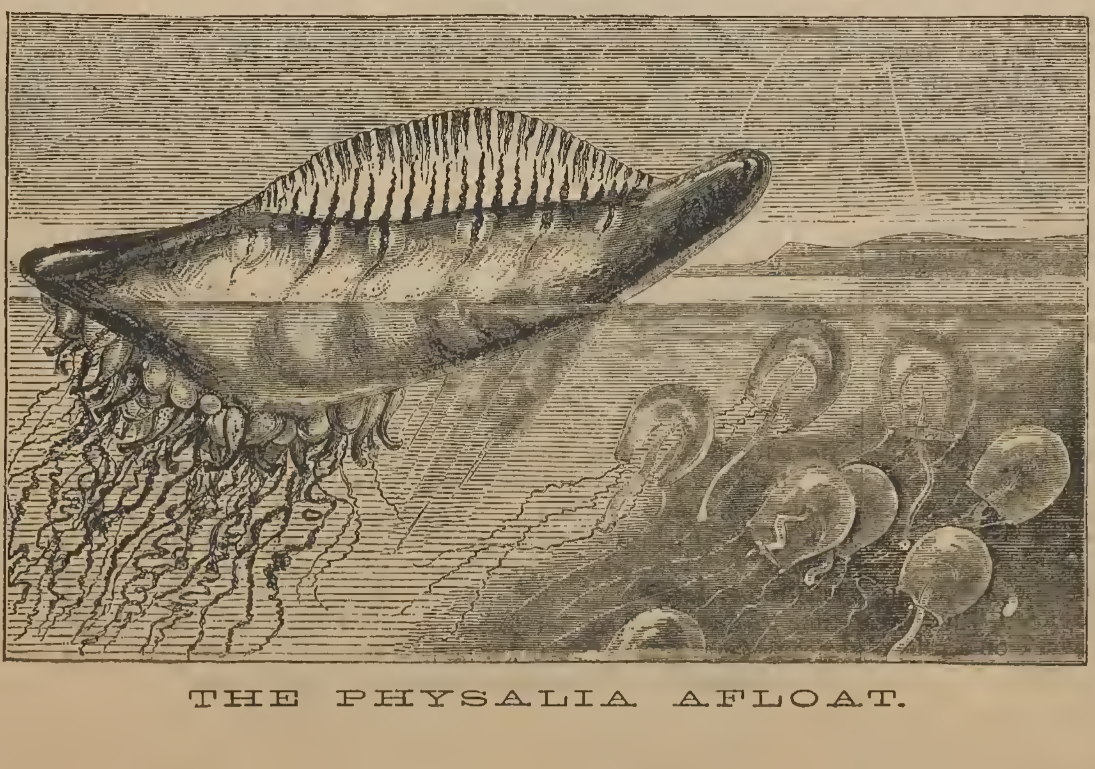
THE PORTUGESE MAN-OF-WAR.

Though the Portugese navy has long since ceased to rule the seas, yet there still remains to perpetuate its fame and former greatness a rare little sea wonder, which sailors and landsmen have alike come to know by the name of the Portugese Man-of-War. This interesting and beautiful creature is known among naturalists as the Physalia—a derivation from the Greek, signifying bladder.

"Let us imagine," says one of its many historians, "a great cylindrical bladder, dilated in the middle, attenuated and rounded at its two extremities, of eleven to twelve inches in length, and from one to three broad. Its appearance is glassy and transparent; its color an imperfect purple, passing to a violet, and then to an azure above. It is surmounted by a crest limpid and pure as crystal, veined with purple and violet in decreasing tints. Under the vesicle float the fleshy filaments, waving and contorted into a spiral form, which sometimes descend perpendicularly like so many threads of crystal blue."



Physalia, with Tentacles Expanded.



THE PHYSALIA AFLOAT.

The accompanying illustrations will serve to indicate the general form and structure of the Physalia. In the upper figure we have the tentacles extended, and it is stated, on the authority of Dr. BENNETT, that these long cables can be thrown out to a distance of twelve feet. By their aid the creature is able to catch and entangle small fish, which, when once captured, are drawn up in contact with the small suckers, owing to the wonderful retractile powers of the tentacles. The bladders, when fully inflated, present so great a surface exposed to the wind, that sailors have been naturally led to suppose that the creature is supplied with sails for the sole purpose of navigation. This bladder is, however, nothing more than i's name signifies, being, in fact, a thin membrane which, it is claimed by many, may be inflated at pleasure, and is thus designed to enable the possessor to float or sink. Along its upper edge there runs a sail-like membrane which, when the bladder is inflated, assumes an erect position, and thus doubtless serves, in some degree, the purpose of a sail. There is, it might here be stated, a question among observers whether the Physalia ever does descend, founded, no doubt, on the fact that the organs which are needed for this expansion or contraction of the vesicle are not discernible.

To the observer merely the Physalia presents points of interest and peculiarities of structure which render it one of the most interesting of marine forms. If, however, our interest is so excited as to prompt a more intimate scrutiny of its parts, we may soon become aware of certain peculiarities which it were more pleasing to know than to experience. In fact, this beautiful and apparently harmless little sea sailor is relatively as formidable an adversary as ever were the armed hulls of the fleet from which it takes its name. At the extremities of each tentacle are organs which act as stings, and which, when allowed to come in contact with the human flesh, poison it in a most painful and often serious manner. An instance illustrating this stinging power is told by the voyager Leblond, and is endorsed by many other of its victims. On one occasion, while this traveler was bathing with some friends, he amused himself by diving, after the manner of the native Caribeans; that is, he would plunge under the wave as it was about to break. Having once reached the other side of the wave and gained the open sea he would return to shore on the crest of a second wave. This rashness, he states, nearly cost him his life, as a Physalia, many of which were stranded upon the beach, fixed itself upon his shoulder at the moment the wave landed him on the beach. Although promptly detached, many of the filaments remained glued to the skin, and the pain experienced was so intense as to make him faint. An immediate application of oil relieved the pain, though it was several hours before restoration was complete.

The stinging property appears to reside in the tentacles alone, as the remaining portions of the body may be handled with impunity. So virulent is the poison here secreted that, when removed to a cloth, the latter will retain the virulent principle for many days, and from the surface thus infected it can be communicated to other objects.

Fight Between a Trout and a Water-Snake.

Mr. A. W. Chase, of the U. S. Coast Survey, contributes to *The Popular Science Monthly* the following interesting account of a remarkable conflict between a large water-snake and a trout, witnessed by himself and one of his brother officers in the survey in 1867, on the Purissima, a small trout-stream which empties into the ocean about twenty-four miles south of San Francisco.

"We had been fishing on the stream, and came to a high bank which overlooked a transparent pool of water about ten feet in diameter and four feet in depth. This pool was fringed with willows, and had on one side a small gravel bank. The trout at first sight was lying in mid-water, heading up-stream. It was, as afterwards ascertained, fully nine inches in length, a very desirable prize for an angler. While studying how to cast our flies to secure him, a novel fisherman appeared, and so quick were his actions that we suspended our own to witness them. This new enemy of the trout was a large water snake of the common variety, striped black and yellow. He swam up the pool on the surface until over the trout, when he made a dive, and by a dexterous movement seized the trout in such a fashion that the jaws of the snake closed its mouth. The fight then commenced. The trout had the use of its tail and fins, and could drag the snake from the surface; when near the bottom, however, the snake made use of its tail by winding it around every stone or root that it could reach. After securing this tail-hold it could drag the trout toward the bank, but, on letting go, the trout would have a new advantage. This battle was continued for full twenty minutes, when the snake managed to get its tail out of the water and clasped around the root of one of the willows mentioned as overhanging the pool. The battle was then up, for the snake gradually put coil after coil around the root, with each one dragging the fish toward the land. When half its body was coiled it unloosened the first hold and stretched the end of its tail out in every direction, and, finding another root, made fast, and now using both dragged the trout out on the gravel bank. It now had it under control, and, uncoiling, the snake dragged the fish fully ten feet up on the bank, and I suppose would have gorged him. We killed the snake, and replaced the trout in the water, as we thought that he deserved liberty. He was apparently unhurt, and in a few moments darted off. That the water-snake of our California brooks will prey upon the young of trout, and also smaller and less active fishes, I have noticed, but never have seen an attack on a fish so large, or one more hotly contested."

FISH IN FACT AND FABLE.

3.

THE TROUT.

WRITTEN EXPRESSLY FOR THE AQUARIUM JOURNAL.

There are some words so happily suggestive of the things which they represent, that they almost make out a clear case for the theory of the inspiration of language. For instance, the word trout. It is not only the power of association; the very sound conveys an impression of crispness and coolness, of shady nooks and glistening pools, where the brook

> Winds about and in and out,
> With here a blossom sailing;
> And here and there a lusty trout,
> And here and there a grayling.

Perhaps to the epicurean mind it suggests, also, country breakfast tables, with the tempting accompaniments of golden butter and rich cream.

But even this word does scant justice to the speckled beauty of the mountain stream. It requires the pen of that poet and prince of anglers, Isaak Walton, to describe the swift grace of motion and exquisite blending of tints, which distinguish the salmo fontinalis, or common brook trout. The beauty of color, however, belongs only to its perfect condition, and it is more susceptible than any other fish to surrounding influences. If the bed of the stream which it inhabits is muddy the trout loses its delicate tints and assumes a dingy and dark brown hue; while in a rock-bedded or gravelly brook, the skin grows variegated and lustrous, and the fishes shine

> "Like golden ingots from a fairy mine."

This change of color is one of the marvelous adaptations of Nature for the preservation of the fish, by rendering it as nearly as possible invisible and indistinguishable from either the dark or the dazzling background.

Another influence affecting very decidedly the beauty of color, is the time of the year. The trout season lasts from about the first of April until October; that is from the time when the fish are fully roused from their winter torpor, till the beginning of the spawning season. The budding of the willow is supposed to mark the first appearance of fine trout in the streams, and hence the willow is known as the anglers' trysting tree, and has been made the subject of a graceful little lyric by Stoddard, an English angler and poet:

> Sing, sweet thrushes, forth and sing!
> Meet the morn upon the lea;
> Are the emeralds of spring
> On the angler's trysting tree?
> Tell, sweet thrushes, tell to me!
> Are the buds on our willow tree?
> Buds and birds on our trysting tree?

From this time onward, almost until the first frosts, the trout increases constantly in size and beauty. One who would see it in its perfection must stand, on some midsummer day, by the bank of a heavily wooded, swift and gravelly brook, and keeping himself carefully concealed, gaze into the pool

> Where sensitive of every ray
> That smites the tiny sea.
> Their scaly panoplies repay
> The loan with usury.

It is very easy thus to catch a glimpse of these bashful beauties, but the artful coquettes are much more willing to be admired than to be caught, and for an unpracticed hand to hook one would almost require the charmed rod of the fairy queen in the Arabian Nights.

The trout is probably the shyest of all fish. Shining minnows, alluringly wriggling worms, and especially brilliant artificial flies are used as bait to tempt the unwary from their nooks, but the most skillfully thrown lines fail time after time to attract even a nibble, and it is by no means an easy thing to throw a line skillfully. Michael Angelo's definition of genius as eternal patience is especially applicable to angling. The expert fisherman has need of a quick eye, a sure hand and an unlimited stock of perseverance.

Walton says angling is like poetry, a man must be born to it; so accurate and so delicate must be the senses. But in the notes to his book, "The Complete Angler," a story is told, and vouched for by Captain Rickets, an American, who says he saw three men in Switzerland going to take trout, one equipped with a sledge hammer, another with a crowbar, and a third with a large basket. He followed them to the brook and watched the operation The first man struck a heavy blow on a stone in the centre of the stream, the second swiftly turned the stone over, and the third caught in his wicker basket the fish which had been stunned by the blow of the sledge hammer. This story seems so incredible that it might perhaps have been questioned before this if it were not that every one who reads "The Complete Angler" is charmed beyond the power of criticism. There is an innocent simplicity about it, which, as Charles Lamb says, would sweeten any man's temper in the reading. The Angler's song, for example, is as quaint as the verses of Herrick or Herbert:

> Who hunts doth oft in danger ride,
> Who hawks lures oft both far and wide;
> Who uses games will often prove
> A loser; and who falls in love
> Is fettered in fond Cupid's snare.
> My angle breeds me no such care.
>
> And when the timorous trout I wait
> To take, and he devours my bait,
> How poor a thing sometimes, I find,
> Will captivate a greedy mind;
> And when none bite, I praise the wise
> Whom vain allurements ne'er surprise.

But in talking of the brook trout we must not forget their kindred, the *salmo fario*, or lake trout, which are equally remarkable for their beautiful hues, the quaker grey above shading into a soft cream color below, and both covered with crimson spots, making a combination of colors as rich as the banana and pomegranate of the tropics, and as delicate as the deep red and tea roses of the north. But woe to the unfortunate minnow or tadpole that reverses the old proverb, and rashly believes that handsome does that handsome is, for in spite of its graceful movements and delicate tints the trout is a most voracious marauder, as its mouth betrays by its lining of teeth, not only on the jaws but even on the palate and tongue. Some of these freebooters grow fat on their spoils. In Llyndivi, one of those unpronounceable lakes in Wales, there is a species of trout called Cochy Dail, which weigh twenty-five pounds. In Lough Neagh, in Ireland, trout called Buddaghs are caught, weighing thirty pounds, and our own waters excel both the Welsh and Hibernian, and have produced trout of ninety pounds weight.

The strength of these fish is wonderful. A gentleman, fishing in one of the Adirondack lakes with a light line, spent five hours in trying to pull in a trout without breaking the line, and when the fish was finally drawn into the boat he plunged so violently that it required a severe blow with one of the seats to effectually quiet him. Another angler, equally persevering, but less fortunate, after two hours of gentle persuasion and delicate manipulation, drew up a bough of a tree which had caught in his hook, and giving slightly at each pull, and then rebounding at the release, had given to the hand and mind of the eager fisherman the impression of a forty pound trout. Thus there is no end to the anecdotes related by anglers, and there seems to be a fascination about "the gentle art" which compensates for the fatigue, exposure and disappointment of the process. Walton exclaims enthusiastically:—"Trust me, scholar, I have caught many a trout that the very shape and enameled color of him have been such as hath joyed me to look upon him, and I have then concluded with Solomon, everything is beautiful in its season."

Rachel Farley.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

A merry Christmas to you all, my young friends, and may your whole long lives be as full of health and happiness as these Christmas days. How many of you, I wonder, have bright, warm and beautiful homes, with everything about to make your days happy and your sleep sweet? I hope it is so with you all; but if there should happen to be any among all your ugly uncles or friends who are so poor that they are often hungry and cold, then let me tell these that for them your Uncle Octopus is very, very sorry to day. But they must not give up, nor think it hard that others are happy while they are sad. We who live in the sea are not all rich and beautiful either, and even now some little lonely fish is hiding under the rocks for fear that some hungry shark or greedy pickerel will want him for his Christmas dinner. I know that there may not be much comfort for you in this, and yet I tell you of it just so that you may know that even your Uncle Octopus has a warm heart, though men may call him "cold blooded."

He knows, too, that the creatures, great and small, that live in God's great sea are all his children, and surely the kind master who gives to the fish its food and who watches over the sparrows these cold winter nights will not let any of his children suffer without good reason. And to you who have more than you need to day let me say that in no better, surer way can you be made happy than by trying to help the other little ones whose hearts are sad and whose bodies are tired and cold. Perhaps this will sound queer to you, since you never knew that your Uncle Octopus could preach a sermon, and yet he could not let this beautiful Christmas season pass by without reminding you that there is much that you can do. Perhaps you have little money, for these are hard times, everybody tells us, but whatever you may have just try and give a little part of it to those who need it most, and then when the New Year comes you will begin it with such light hearts and happy thoughts that I know you will be glad of the sober advice that is now given you by your UNCLE OCTOPUS.

"OH! NO. OH! NO."

BY MADGE ELLIOT.

A fisherman went out to fish.
"Oh! herrings," said he, "don't I wish
That something never seen before
I'd catch. My sail would then be o'er,
And I'd forsake the sea for shore,
And no more fishing would I go,
But straightway start a trav'ling show."

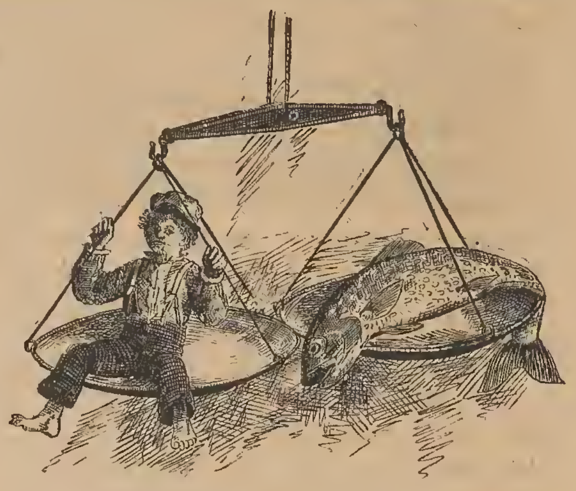
As this he said he felt a bite,
And pulled and hauled with all his might,
And landed—well, it *was* a fright—
And looked like nothing *he* had seen,
Unless, in shape, a violin.
"Great Greenland whales!" cried he, "I know
I've found the wonder for my show."

And reaching forth his hand he took,
Or tried to take, it from the hook,
When, with one blow, up in the air
It sent him flying; all his hair
Arose on end; his eyes did stare
Just like a frog's, and in a town
A full mile off that man came down!

The thing then opened wide its jaws
And laughed with many loud "haw haws."
"Oh! Skates," it said, "how he did fly,"
And winked its very wicked eye.
"He wont want *me* for his old show—
I bet he wont—oh! no, oh! no,
For I'm a stunning *Torpedo*."

* * *

What is the reason that the two "little ladies" who received the first prize for their compositions about the whale do not come to the Aquarium and get them. Or if they cannot come why do they not send some one to get them. They are all ready and waiting, and you have only to tell the gentleman who is selling gold fish who you are and what you have come for, and he will give you the globe and fish as promised by Uncle Octopus.



A BIG FISH AND A LITTLE FISHERMAN.

Every child who has spent a summer in the country is familiar with the speckled and shining little fellows that dart along in the brook, and vanish when they find themselves watched, as suddenly as the bright eyes of a mouse whisk away from a hole in the cupboard.

Yes, you all know the brook trout, but perhaps you are not as well acquainted with his big brother, the lake trout, who, like other big brothers, does not have anything to do with the little fry, but gets along swimmingly with his famous cousins, the Salmon family, who live in the large lakes. Well, it is about him that I am going to tell you a queer story, and a true one, too.

Once upon a time a little boy, eight or nine years old, was fishing in the lake at Fort Washington, away out West. He had gone out in a boat alone, though there were a number of people on the shore. After throwing his line several times without getting a bite he suddenly felt a very decided nibble, and at the same time the line bobbed down so quickly into the water that he was almost jerked overboard. He just managed to save himself, however, and now the struggle began in good earnest. They pulled this way and that, now one getting the better and now the other, like Mr. Punch and the hangman. Every time that the boy, tugging with both arms, hauled the fish to the top of the water, it plunged so violently that he had to let out the line again. For a long time no one could tell whether the fish would be dragged out of the lake or the boy into it, but finally, by the help of a firm brace against the side of the boat and a strong pole and line, the little shaver pulled in a magnificent trout, and rowed to shore in triumph.

Meanwhile the crowd on the shore had watched the contest, and when they saw the trout flop over the side of the boat you should have seen the way they waved their hats and handkerchiefs in their delight and excitement! Some of the men made bets as to which was heavier, the captive or the captor, and when the boat touched the land scales were sent for and brought down to the shore, and there, amid shouts and cheers, the boy was put in on one side and the fish on the other, and, would you believe it! there was only six pounds difference in their weight—the little fisherman weighed just forty-six pounds, and the trout weighed forty. That is as big as quite a good-sized pig. Wouldn't you like to have been that boy? RACHEL FARLEY.

W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL.

W. S. WARD, Editor.

NEW YORK, DECEMBER 20, 1876.

THE AQUARIUM JOURNAL *will be published semi-monthly at the New York Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

An important result will have failed of its accomplishment if the establishment of the New York Aquarium has not served to direct the visitor's attention to the *study*, as well as general observing, of the structure and habits of the many marine forms there displayed. While there are, beyond question, many who are drawn to the Aquarium by another motive than that of idle though worthy curiosity, yet is it also certain that the majority who visit it are as yet unfamiliar with the special peculiarities of many of the most interesting creatures here exhibited, and who, if they were told of them, would find their visits much more satisfactory and profitable.

It was with a view of heightening this popular interest, by the aid of instructive and brief essays on the various subjects treated, that this *Journal* was established; and in the furtherance of this service we would direct special attention to several objects which are deserving of more consideration than they appear to have received.

First among these would we mention the Kingiyo, which is the sole occupant of table tank 24 of the fresh water series. The accompanying illustrated description of this rare and beautiful creature gives such information regarding its history as may be needed; but we desire to emphasize the fact that, so far as can be learned, this fish has attained to its present peculiarity of form and structure as the result of a careful system of culture. The existence among our own native gold fish of specimens which exhibit, in a lesser degree, this phenomenon of the so-called "three tails," is well known, as at least one specimen, if not more, is already on exhibition in one of the globes near the entrance. Whether by grouping fish of this character together, and then by a watchful system of breeding, selecting the exaggerated types and isolating them from the others, the result might not eventually prove to be a veritable Kingiyo, is a question yet to be definitely settled. Hence it is that this peculiar fish is one of special interest.

Again, we have the Proteus, an illustrated description of which appears elsewhere. The peculiar structure of the breathing organs, combined with other features, have led certain modern theorists to claim for this creature a middle place between the reptile and the fish.

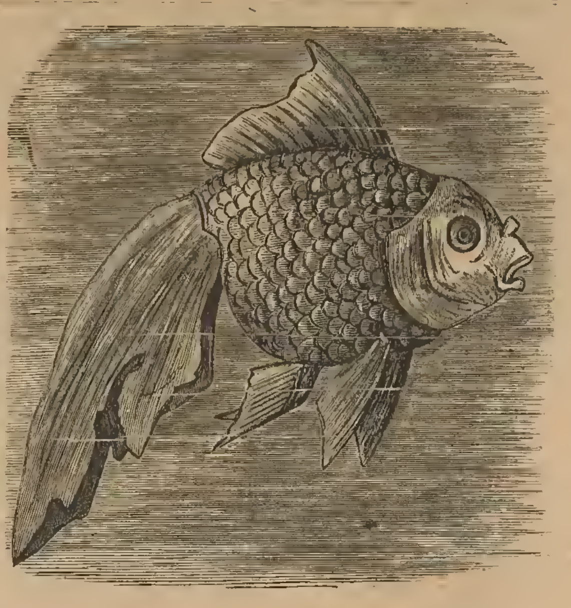
The visitor cannot have examined the Anemones without perceiving that here is a field that might worthily be cultivated. The opportunity for observing the habits of these beautiful creatures, in order to determine not only their structure but their intelligent actions, is unrivaled, and already is the naturalist of the institution, and others who share his interest, carefully noting the methods by which these creatures multiply and increase, not as is usual by means of eggs, but by means of detached portions of the body, which gradually assume a form similar to that of the parent stock, until at length the detached section blooms out into a minute but perfectly formed Anemone.

Then, also, we have before us in great variety the interesting Hermit and Spider Crabs, both of which, by virtue of special peculiarities, are objects of peculiar interest, and worthy of special study.

From time to time we shall devote extensive space to illustrated descriptions of these exceptional types. In the meantime the visitor would do well to critically examine and become familiar with them. If these are beautiful and strange as they appear, still greater will be their interest when more is learned of their habits and the marvelous peculiarities of their structure

HERMIT CRABS.

Scattered at intervals on the shingle bottomed tank (6) or in closely collected groups, wil be seen numbers of those quaint Crustacea, remarkable for their habit of approaching the deserted shells of other animals, for the better protection of their otherwise tender and defenceless hinder quarters. This foregoing peculiarity has won for them the popular title of Hermit Crabs, although on account of their extremely irritable and pugilistic disposition, they are about equally well known as Soldier Crabs. The Hermit Crab (*Pagurus bernhardus*), is most frequently found, when young, inhabiting the cast-off shell of the Dogwinkle (*Purpura lapillus*`, and at a more advanced condition of growth than that of the Common Whelk (*Buccinum undatum*). The process by which the Hermit Crabs have gained possession of these highly ornamental residences, in place of their former sybaritic hut, is an artificial one, each individual having been originally extracted from an ordinary Whelk shell, and left in company with others of a foreign type, from which it almost immediately made a selection. On the shores of tropical seas Hermit Crabs normally inhabit these brilliantly-colored and fantastic-shaped abodes, including also the beautifully-spotted and naturally highly polished Cowries; in this latter instance the species of Hermit has a specially flattened body and general contour to enable it to utilize these remarkably narrow-apertured shells as a suitable protection.



JAPANESE KINGIYO.

The presence in the Aquarium of this wonderfully beautiful, and strangely grotesque fish, should be a cause for special congratulation. The specimen exhibited in table tank 24, of the fresh water series, was brought from Japan by a gentleman who has furnished the following interesting facts regarding it:

Starting from Japan with eighty-eight, he arrived in Baltimore with but seven, all of which are now alive and in good health. The captain of the steamer taking great interest in his efforts to introduce the fish to America, built a tank on the steamer to accommodate them, and took in a supply of river water; but it was soon found that the motion of the ship dashed the fish against the sides of the tank and many were lost. To obviate this a smaller tank was built and suspended like the compass, which counteracted the motion of the ship; but notwithstanding all the care bestowed on them only fifteen arrived in San Francisco, all in a very weak condition. Of these eight subsequently died.

The Japanese claim that the brilliant colors displayed in this fish, and the wonderful development of its triple tail, is the result of many years careful breeding. This one is an unusually fine specimen. In Baltimore great care was taken of the seven survivors, and during the summer they spawned, the result being about fifty young fry, which exhibit all the peculiarities of the originals. It is the intention of the owner when he has a sufficient stock, to donate them among persons who will take an interest in them and carefully raise them.

For the benefit of any of our readers who have not as yet been able to visit the Aquarium, we would state that in outline and general appearance the above illustration, drawn from life by Mr. VANCE, is exact and truthful in every particular. The body is red in color, similar to that of a brilliantly-hued gold fish; the tail, however, is a pearly white, and as it rests in the water presents the appearance of a fine, silken fabric, terminating in a delicate fringe. In addition to the peculiar attraction which the form of the fish is to the general observer, the naturalist will find in its very existence and the tradition regarding its origin theme for thoughtful study.

If the Chinese can accomplish such results in the modification of special features, by aid of their crude appliances, there is every reason to believe that, with our more complete arrangements, still more marvelous results may be obtained. At least the attempt is to be made, and already the naturalist of the Aquarium has taken measures to apply and test the Chinese methods with the hope that still more valuable results may be secured. A careful record of these experiments shall be kept, and at a future day we shall hope to present to our readers, and exhibit to the public, specimens of fish, the results of special culture, which will rival in interest the oriental beauty now on exhibition.

THE ITZEBU AND THE LACE FICHU.

A BALLAD WHEREIN IS EXPLAINED THE GENESIS OF THE WONDERFUL JAPANESE FISH, IN STRICT ACCORDANCE WITH THE DARWINIAN THEORY.

THE ITZABU.
THE FICHU.

Now this is the story of King-i-yo,
A wonderful fish from the Isle Jesso,
Of species which nobody ever can know;
For if the legend be true
The creature was slowly developed in time,
Many ages ago in a far distant clime,
From a gold itzebu, and what else don't rhyme,
But it was a lace fichu.

There once was a damsel they called Ah Foo,
Whose teeth were black and whose finger tips blue,
And three porcupine quills ran her chignon through,
Which made her quite lovely to see.
And she fell in love with a washman named Wang,
Who paddled a junk on the river Kiang,
And sailed from the city whose name begins Shang,
To the Empire Japanee.

Ah Foo was a wife of the great Tycoon,
And Wang but a slave of the Son of the Moon;
And therefore for him to encourage her lunacy, was a very wrong thing.
But Wang had a habit of telling huge lies;
He'd a conscience oblique as his almond-shaped eyes,
So he told poor Ah Foo, who was not over wise,
At home he was Mandarin.

The consequence was that these misguided two
Hatched a plan to elope; and the fickle Ah Foo
Cajoled from her liege lord a gold itzebu
To buy her a new lace fichu.
But instead, as she promised, investing the gold
In the filmy lace garment, she quietly told
The shopman to "charge it to Buster," and boldly to meet her fond lover she flew.

But scarce had she fairly got over the sill
Of the shop when, suspecting that something was ill,
The clerk sent an A. D. T. boy with the bill
Right off to the mighty Tycoon.
And you may believe that that high potentate,
In a manner politeness forbids me to state,
Rampaged, and commanded that Ah Foo be straightway
bulldozed that same afternoon.

THE FIERCE TYCOON.

On the wrath of the husband let's here draw a veil,
When he found that Ah Foo and her Wang had set sail,
And were floating away with a favoring gale
To the far-distant Chinese shore.
The Japanese kingdom was scarce out of sight,
When Wang sweetly asked "Izze money all light?
Where's ze itzebus whichee you told me you might
Hook out of the Tycoon's store?"

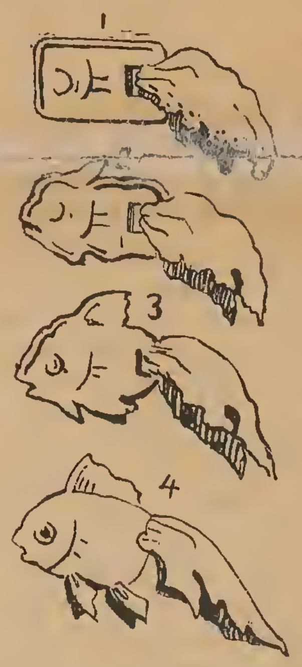
"Me no habby money, sweet Wangy, my dove;
You got plenty cashee—if not, live on love."
"Not much," remarked Wang, and he gave her a shove
Away with a hideous look;
Then he set up a screech and his pigtail tore fast,
Till, waxing outrageous, he jumped up at last
And the bawling Ah Foo straightway overboard cast,
Where a shark a large bite of her took.

THE FATE OF AH-FOO.

But the money of Ah Foo went down with her, too,
For during the conflict it overboard flew,
And the lace, being tied in the hole that is through
The coin, remained with the gold.
Now, no evolutionist will disagree
That in altered conditions of life things may become totally changed, and this same we shall see
In the sequel, now soon to be told.

When at length on the bottom the gold came to rest,
It found itself lodged in a yellow Carp's nest;
That Cyprinus at present, I'm free to attest,
Such domiciles does not prepare;
But of course it is known that the yarn I relate
Happened ages ago, and 'tis needless to state
Since then the Carp species has undergone great
Change in habits, as all are aware.

As the coin and lace lay there tossing around
In the waves, while between the sharp rocks they were ground,
The lace grew quite ragged, the gold became pounded
quite flat, into scales very thin.
As centuries passed this form modified more,
Till at last it was altered, as you see before
You in sketches here given marked two, three and four,
To an object with tail and with fin.



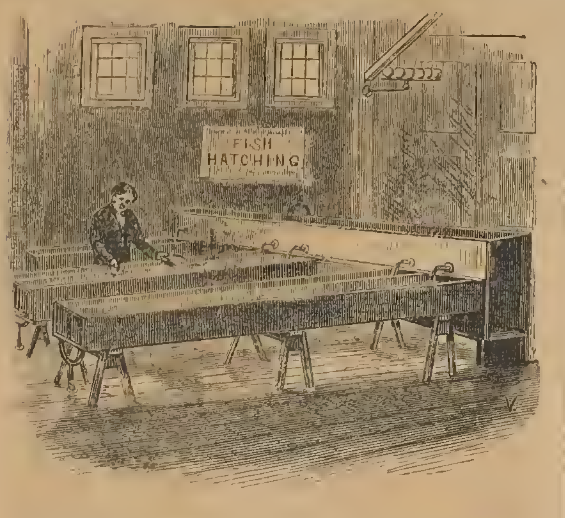
Protoplasm by causes which can't be explained,
In marvelous manner from sea-weed was gained,
And thus the strange creature in life was maintained,
And so it of course had to grow.
And then, being located in a Carp's nest—
The force of environment acting its best—
Changed fichu into fish, while the gold with the rest
Formed the scales of the King-i-yo.

MORAL,

(BY THE MANAGEMENT.)

Since Nature could make Fish from Gold,
Why, 'tis not much to wish
The rule may work the other way,
And Coup make Gold from Fish.

P. B.



FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Two of the troughs are now filled with young of the California Salmon from three to five weeks old which were hatched where they now lie, from eggs which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalists the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years, but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

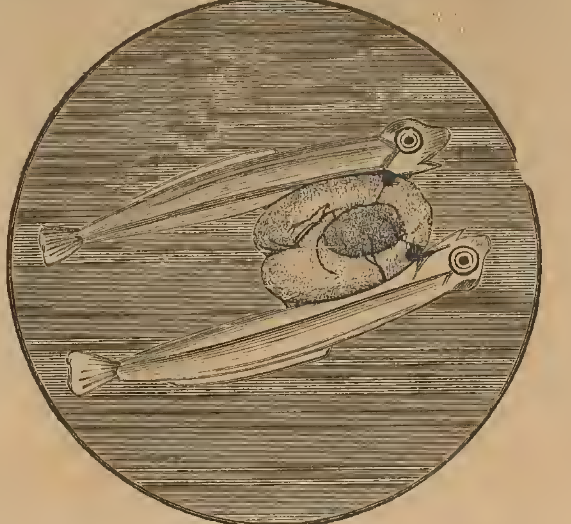
The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, according to the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Another trough contains 25,000 eggs of the Lake Whitefish, and 15,000 eggs of the Cisco or fresh water Herring, which were presented by Mr. Geo. Clark, one of the Michigan Fish Commissioners, and a recent addition of the eggs of Whitefish, Lake, and Brook trout from Mr. Seth Green, Superintendent of Fisheries for New York, has been made, to be followed in February by the Land Locked Salmon from Maine, the gift of Prof. Baird; these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the Journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.

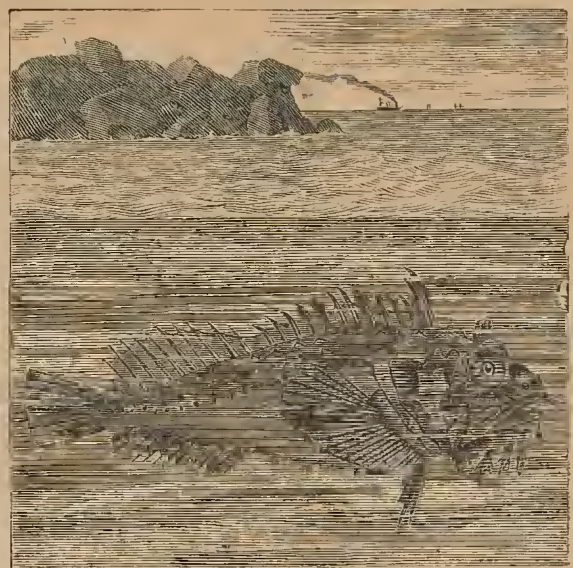
It is expected that Salmon will be ready to take food at about six weeks old when the sac will have been entirely absorbed; they will then be in condition to find their own living in the streams if put in such spring creeks as are chosen by the parent fish as a place of deposit for the eggs.



THE TWIN SALMON.

The Twin Salmon or " salmonese twins" as the aquarium wag has christened them, are among the most interesting objects now displayed in Mr. Mather's department. The above illustration taken directly from the life is a careful representation of these queer little creatures as they now appear under the magnifying glass. The two bodies are attached to one sac, but each fish is perfect in itself. The connecting vesicle is filled with oil globules, arteries and veins, and it was expected that a microscopic examination would discover a diaphragm separating the circulation into two distinct systems. The closest scrutiny, however, fails to discover this wall and the circulatory systems appear so intimately connected that the blood flows freely from one body to the other, impelled, however, by two hearts.

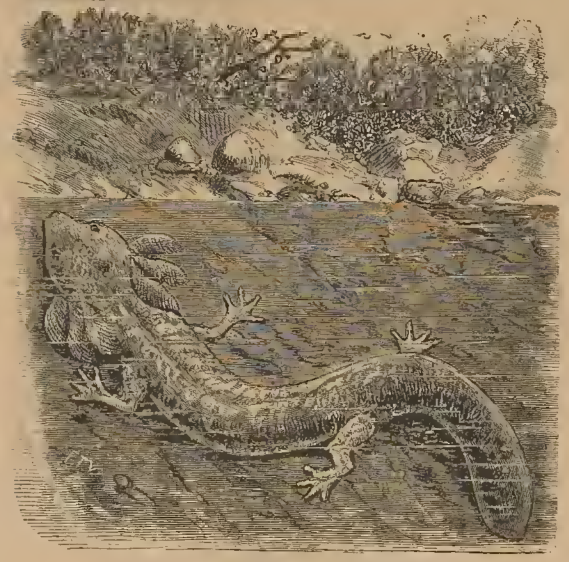
From the extended observations of Mr. Mather, it appears that these deformities are quite frequent in the salmon family, which includes the trout, and in hatching one hundred thousand eggs, there may be from three to five hundred abnormal specimens, comprising crooked backs, twisted heads and tails, and in some instances two or even *three* heads are attached to one body.



THE SEA RAVEN.

Hemitripterus Americanus.

Closely connected by family ties to the Sea Swallow, is the Sea Raven, a fine specimen of which may be seen in table tank 4, and it is always surrounded by *doubtful* admirers who speculate as to the *ownership* of the wonderful tufts, "bobs," and masses of disjointed flesh that seem to cover it, and the visitor is not rarely led to believe that by a system of inactivity it has been covered with a growth of aquatic plants and verdure. But they are all "real," and this fantastic ornamentation is the bona-fide work of nature. It is subject to great variation of color, and the Aquarium will soon possess specimens, varying from the rich, russet brown to a bright *carmine* yellow and red.



THE BANDED PROTEUS.

Menobranchus Lateralis.

The Banded Proteus now to be seen in table tank 17 of the fresh water series, is one of the most curious and interesting of aquatic animals. As the visitor to the Aquarium will be able to observe its peculiarities of form and structure, no extended description of them is needed. It will be well, however, to direct attention to the peculiar form of the gills, there being three on each side, ramified and fringed, and of a red color, on account of the blood which circulates through them. Dr. Beall invented an ingenious arrangement by which this phenomenon of circulation could be witnessed. The blood dics are of so extraordinary a size that they can be distinguished by an ordinary pocket magnifier while passing through the vessels.

The Banded Proteus is found in Lake Champlain and at the outlet of Lake George. It is also to be found in certain of our Northern and inland lakes, where its presence is a bane to the fishermen, since it has a peculiar fondness for the spawns of the white fish. Its movements in the water are usually slow, but, from the size of its tail, it is evident that when occasion demands it can move with great speed. They are said occasionally to come upon the land. Its color is brownish with blackish spots, and its length varies from one to two feet.

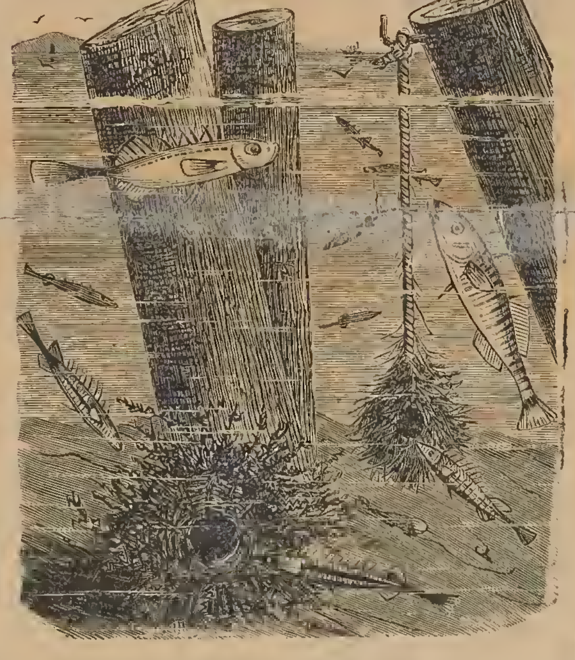
Wood, writing of the *proteus anguinus*, states that at the duchy of Carmiola is a most wonderful cavern, called the grotto of the Maddalina extending many hundred feet below the surface of the earth, and consequently buried in the profoundest darkness. In this cavern exists a little lake, roofed with stalactites surrounded with masses of rock and floored with a bed of soft mud, upon which the Proteus may be seen crawling uneasily, as if endeavoring to avoid the unwelcome light by which its presence is known. These creatures are not always to be found in the lake, though after heavy rains they are tolerably abundant.

The same writer adds that the discovery of this animal is extremely valuable, not only as an aid to the science of comparative anatomy, but as affording another instance of the strange and wondrous forms of animal life which still survive in hidden and unvisited nooks of the earth. For several of the specimens now on exhibition our acknowledgements are due to Prof. Birt. G. Wilder of Cornell University.

COMMON STICKLEBACK.

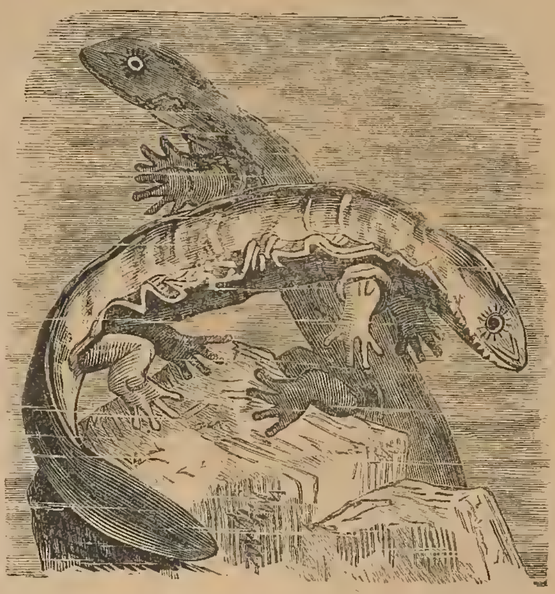
Gasterosteus Pungitius.

This well-known fish is found in ponds, streams, and rivers, and appears equally suited to salt water, and belongs to the order of spine-finned fishes known scientifically as Acanthopterygii. It is extremely voracious. An observer, once standing by the side of an ornamental lake, saw a young frog hopping past. He threw it in a short distance to exhibit its powers of swimming to a young bather, anxious to learn the art. The moment it reached the surface of the water, a flash of light seemed to be emitted from the bottom. It was caused by a shoal of Sticklebacks, which pounced upon the unfortunate frog with great fierceness. In a few moments the four legs of the poor creature were eaten away, and new shoals came hurrying from more distant parts of the lake to the prey. The battle that took place round the victim was as desperate as could be imagined. Though pelted at with bits of gravel, they would not leave it, but continued to nibble and battle among themselves as long as a particle remained. This instance of voracity is, however, not surprising, for they do not hesitate to devour one another.



The peculiarity of the Stickleback which, however, commands the special attention of the naturalist, is its expertness as a nest-builder. In the first number of the *Aquarium Journal* an extended description of the methods employed by these fish in the construction of their marine homes was published. The illustration here given shows the form of the nest, and also depicts the ingenuity of the little builders in the choice of a location. Here it will be seen that one has chosen the end of a rope as the site of his home, and by the aid of his mouth alone has converted it into a nest. A number of these graceful and ingenious little creatures may now be seen in post tank 28.

In addition to its instinctive skill and intelligence the Stickleback, it is claimed, may be trained and instructed by man. As illustrating this Prof. Butler, the Superintendent of the Aquarium, states that he has been able, by the aid of an ingenious but simple device, to teach his Sticklebacks to ring a bell when they wanted food. The bell was suspended above the tank, and the connecting rope, a fine thread, having been baited was lowered into the tank below. The nibbling of the bait rang the bell. Care having been taken to add fresh bait whenever the cord was pulled, the little Sticklebacks soon learned to summon their attendant by this means.



THE ALLEGHANY HELL-BENDER.

Menopoma Alleghaniensis.

The interest which attaches itself to the series of fresh water tanks at the Aquarium is mainly divided at present between the Proteus as seen in tank 17 and the subject of the present sketch. As its name indicates, the Hell-bender is found in the Alleghany river and other tributaries of the Ohio. It is also known as the Salamander of the Alleghanies. The specimens shown in tank were presented to the Aquarium by the Buffalo Society of Natural Sciences, through its Secretary, Mr. A. R. Grote, who also read an interesting paper on the subject before the American Academy at its last meeting. This gentleman also records, in the *American Journal of Science*, the interesting fact that this animal sheds a transparent membrane which he believes to be the exterior layer of the skin. While observing one in the Aquarium of the Buffalo Society of Natural Sciences, an almost complete skin, all the feet and toes being readily perceived, was seen floating in the water, and later the creature was discovered in the act of swallowing his former covering, a practice which has also been observed in the toad. In a recent communication Mr. Grote describes this operation of shedding the skin, from which we learn that this thin and transparent membrane is first seen to loosen and separate from the entire surface of the body, appearing at this stage like an envelope or glove in which the animal is contained. By a number of wide gapings, during which the mouth is opened to the fullest extent, the skin is parted about the lips, and then commences to fold backward from the head. Convulsive and undulating movements with the body and fore legs are employed to extract these from the loose skin. The skin then readily falls backward, as the animal crawls forward and out of it, until the hind legs are reached, when the menopoma turns round upon itself, and, taking the skin in its mouth, pulls it over the legs and tail. The operation reminds one of taking off clothes. The cast off skin is retained in the mouth and finally swallowed. The operation is quickly performed. The visitor who watches the menopoma, will observe a swaying motion of the body; this action is not yet fully accounted for, though it is possible that it is connected with the animal's desire to rid himself of his ugly skin.

A female Hell-bender opened on the 21st of August contained well developed eggs attached by a membrane to the oviary. These eggs are laid in a connected string, and are deposited along the muddy banks of the river.

The two specimens of Hell-benders now on view are worthy of special study, and, as in many other cases, we would advise those interested to view them as soon as possible, as already the confinement of the Aquarium has resulted in the death of one rare creature of this class.

A COMPLETE INDEX OF ALL THE FISH IN THE TANKS

The following tabulated list is designed, with the assistsnce of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER TABLE TANKS.

Tank 1.—Anemones.

Tank 2.—Porgies, Pectens.

Tank 3.—Striped Gurnards, barred Killifish, Algae, Toad Fish, Smooth browed Bull Head.

Tank 4.—Sea Raven, Bermuda Lobsters, Lady Crabs, Spider Crabs, Rock Crabs, Winter Flounder, Pectens, Sheepshead Lebias, Algae, Sea Urchins.

Tank 5.—Wharf fish, or Cheesey Black fish, Spider Crab, Pectens, Lebias, Algae, Young Tantog or Blackfish, Cunner, Sea Urchins.

Tank 6.—Harvest fish, Star fish, four varieties, Hermit Crabs, Pectens, Algae.

Tank 7,—Serpula, Living Sponges, Aromias, Bryozoas.

Tank 8.—Anemones, four varieties, Algae, Livng Corals, Sea Cucumber.

Tank 9.—Crabs, 7 varieties, Algae, Shrimp.

Tank 10.—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Shrimp, Algae, Young of edible Crabs, Fiddler Crabs.

Tank 11.—Lafayettes, Algae, Sheepshead Lebias, Little Hermits.

Tank 12.—Sea Horse, Sheepshead Lebias, Algae, Serpula, Periwinkle and Spawn.

FRESH WATER TABLE TANKS.

Tank 13.—Brook Pickerel.

Tank 14.—Lake Trout.

Tank 15.—Young Brook Trout.

Tank 16.—Yellow Perch.

Tank 17.—Banded Proteus.*

Tank 18.—School of black-nosed Dace.

Tank 19.—White Perch.

Tank 20.—Common Pond Fish.

Tank 21.—Long eared Pond fish, and Fresh Water Lobster.

Tank 22.—Hell Benders.*

Tank 23.—Common Sun fish.

Tank 24.—Japanese Kingiyo.*

Tank 25—Pickerel.

Tank 26.—Brown Cat fish.

Tank 27.—N. Y. Shiner.

POST TANKS.

Tank 28.—Sticklebacks.*

Tank 29.—Young Cat Fish, Lobster, etc.

Tank 30.—Dace.

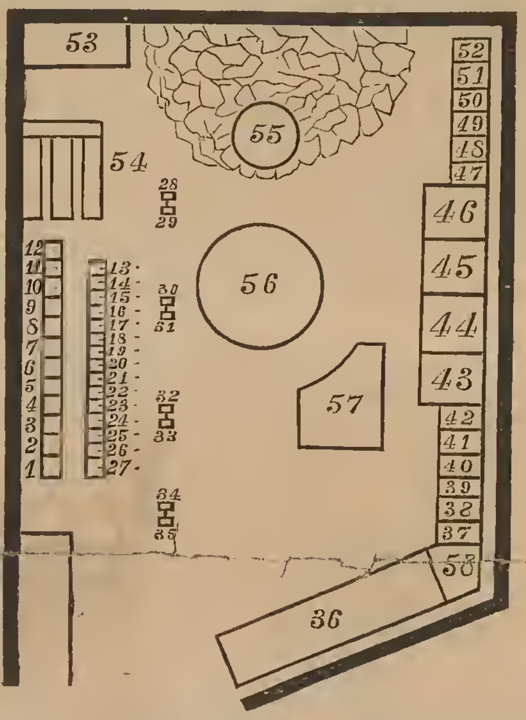
Tank 31.—Algae, Unio, Munnon.

Tank 32.—Fresh water Lobster, Dace.

Tank 33.—Crimson Spotted Triton.

Tank 34.—Black Headed Dace.

Tank 35.—Young Salt Water Actinae, Coral, Algae



Ground Plan of the New York Aquarium.

SALT WATER SERIES.

Tank 36.—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Prickly Skate, Summer Skate, Sand Shark, Smooth Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog.

Tank 37.—Striped Bass, Weak Fish, Codlings, Flounders.

Tank 38.—Five varieties of Star Fish.

Tank 39.—Lobsters

FRESH WATER SERIES.

Tank 40.—California Salmon, Lake Trout, Brook Trout.

Tank 41.—Yellow Perch, Brook Pickerel, Blue Cat-fish, Long-eared Pond fish, common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass.

Tank 42.—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank 43.—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Long finned Chub Sucker, Wall-eyed Pike, Lake Pickerel.

SALT WATER SERIES.

Tank 44.—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank 45.—Lafayette Fish, Flounder, Porgies, Young Skate, Black fish, Striped Bass, Cod

Tank 46.—Tomcod, Blackfish, Striped Bass, Manhaden, Lafayette, King Crab.

Tank 47.—Killi-fish, Tomcod, Toad Fish.

Tank 48.—Lobster, Lady-crab, Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank 46.—Spotted Cod Lings.

Tank 50.—Rock Cod.

Tank 51.—Black Sea Bass.

Tank 52.—Lobster, Striped Bass, Porgies, Lafayette Fish.

Tank 53.—Brook Trout, Salmon Trout, California Salmon.

Tank 54.—Fish hatching troughs.*

Tank 55.—Sea Lion.

Tank 56.—Whale.

Tank 57.—Seals.

***The Asterisks that follow many of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on preceding pages of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in ttaendance for the sole purpose of answering questions.

OUR DRAG NET.

Moral Character of the Oyster.

In temper he is even mild to placidity, although he is sometimes slightly ruffled, on his edges at least. He is quiet always, and usually very well behaving; and yet he participates in nearly every scene of debauch and revelry. He frequents midnight suppers and is the companion—the bosom companion we may say—of wild fellows of every degree. He makes no noise, and does no quarreling, but he is present in well nigh every riotous company, and is found at table with wines and liquors of every kind, name and quality. In himself, and so far as his personal behavior is concerned, the oyster is perfectly respectable, and gentlemen and gentlewomen have him at dinner without scruple; but there can be no doubt that his name is suggestive of dissoluteness and dissipation, precisely as the horse, noble as he is, is indissolubly associated in our minds with certain forms of knavery and with jockeyism "in all its branches" as the street signs say. Dickens, we believe it was, who pointed out the fact that the moment that any man falls into the poverty which comes of drunkenness and idleness, he begins to eat oysters as a regular diet, and notwithstanding the high estimation in which the best of us hold this mollusk, his name somehow suggests irregularity of living, late hours, unwholesome haunts, and potations of gin.—*Detroit Free Press.*

IDENTITIES.

Somewhere—in desolate wind-swept space—
In Twilight-land—in No-man's-land,—
Two hurrying Shapes met face to face,
And bid each other stand.
"And who are you," cried one agape,
Shuddering in the gloaming light;
"I know not," said the second Shape,
"I only died last night."

T. B. Aldrich.

J. W. FISKE,

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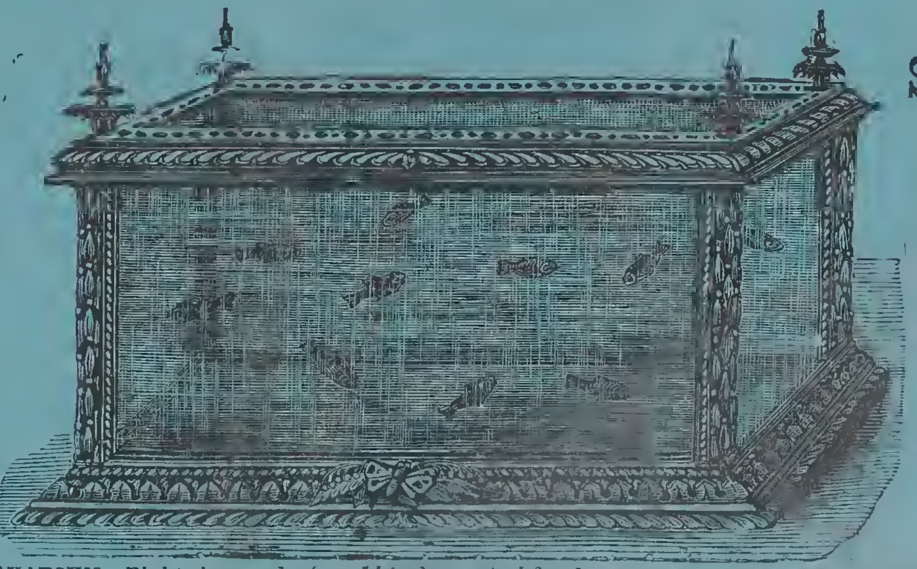
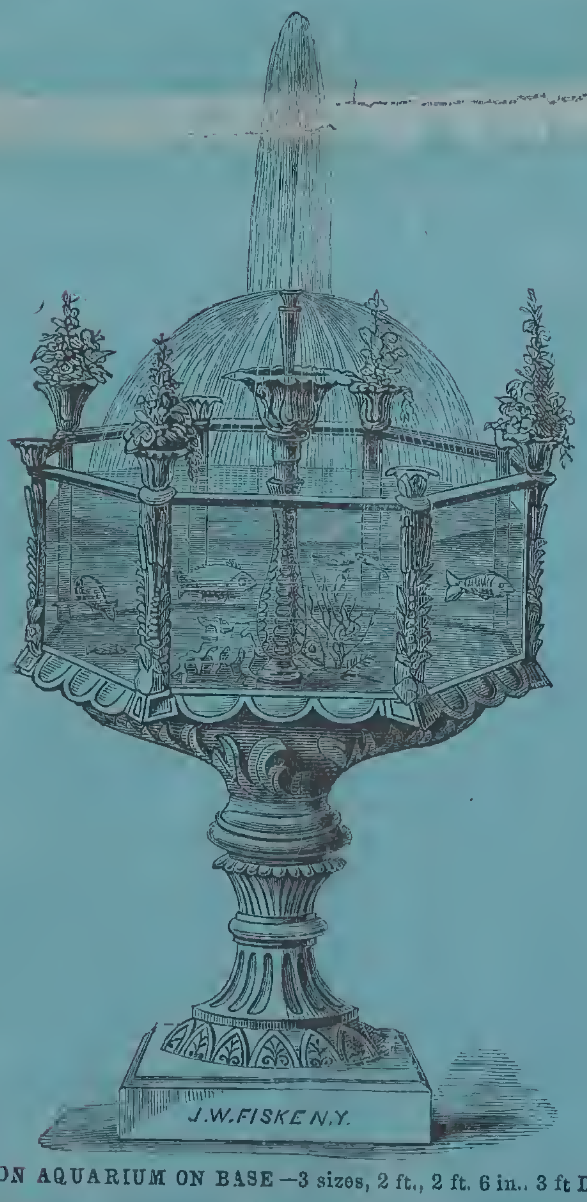
Dogs,
Lions,

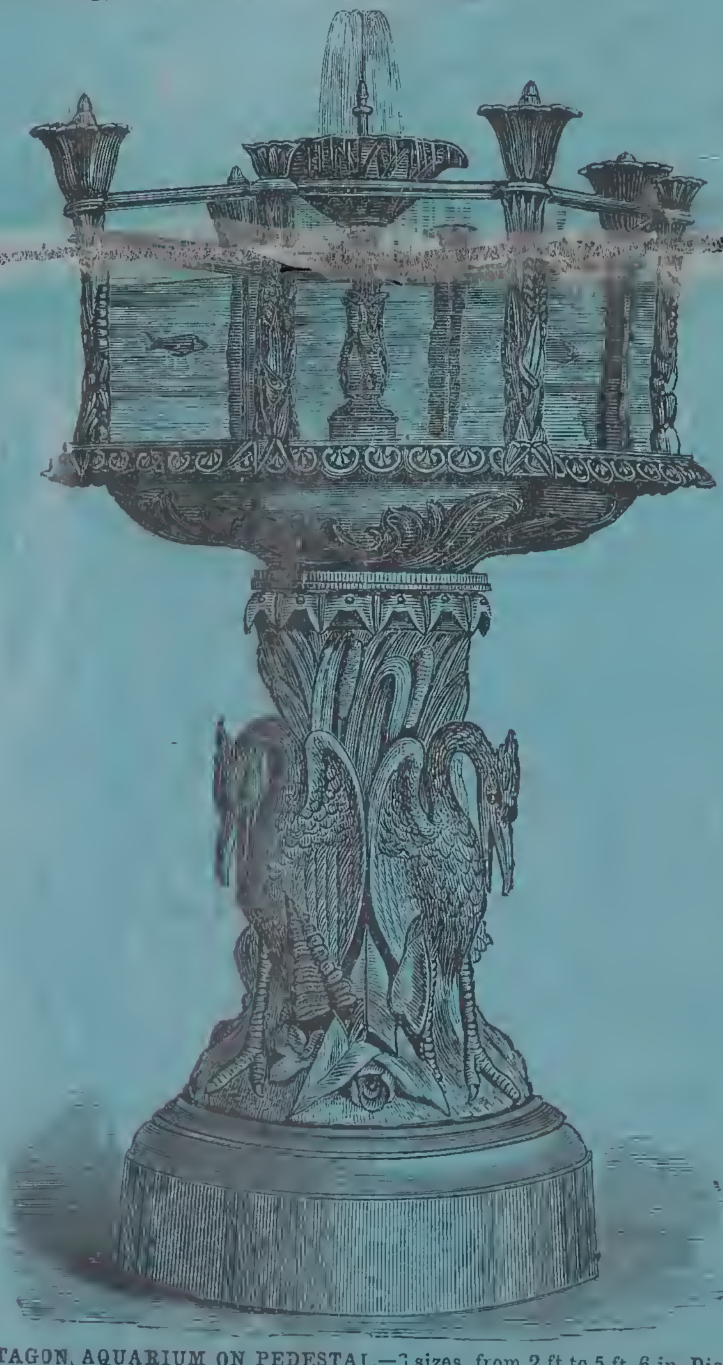
Settees,
Chairs,
Tables,
AND OTHER
Garden and
Conservatory
Adornments.



SQUARE AQUARIUM.—Eight sizes made, from 14 inches up to 4 feet long, with or without Fountain attachment.



OCTAGON AQUARIUM ON BASE—3 sizes, 2 ft., 2 ft. 6 in., 3 ft Diameter.



OCTAGON AQUARIUM ON PEDESTAL.—3 sizes, from 2 ft to 5 ft. 6 in. Diameter.

I also make several sizes Octagon Aquaria, not on pedestal or bases, all of which are sold at greatly reduced prices; these Aquaria are all glazed and bronzed.

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All of these Aquaria can be made with or without Fountain Attachment.

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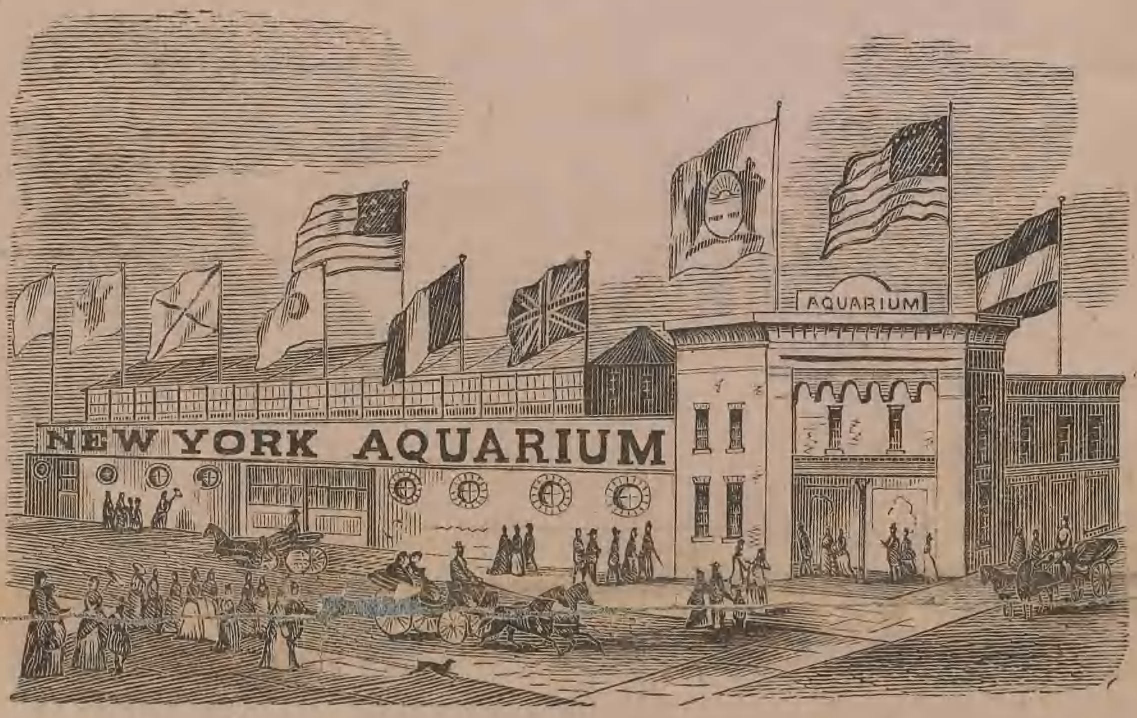

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NEW YORK AQUARIUM.
JOURNAL

Published Monthly at the New York Aquarium, cor. 35th Street and Broadway.

VOL. 1. NEW YORK, WEDNESDAY, JAN. 24, 1877. NO 7.

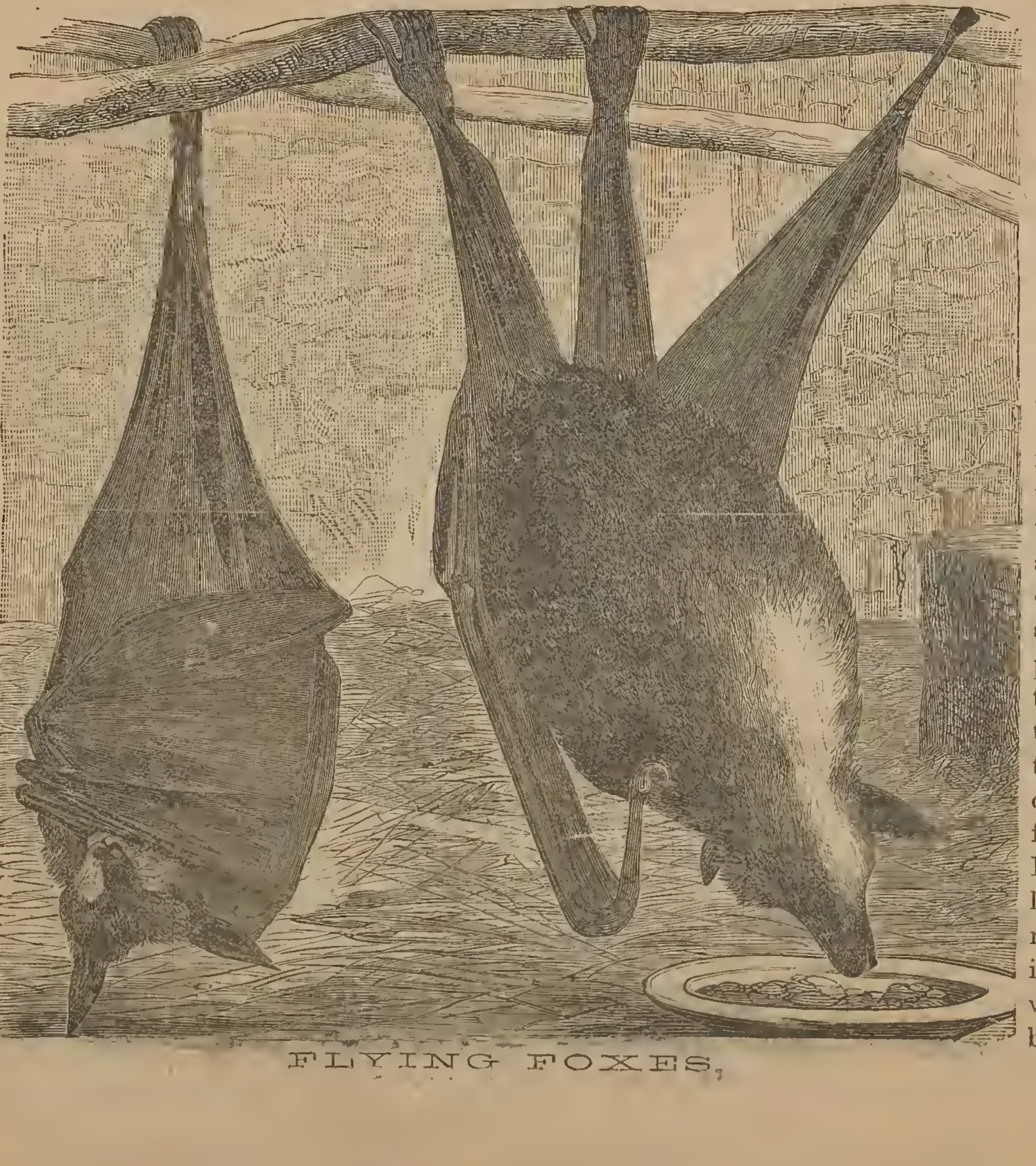
FLYING FOXES.

BY DR. H. DORNER.

The New York Aquarium does not intend to confine itself solely to the exposition of aquatic animals, but will, like the famous Berlin Aquarium, occasionally exhibit other interesting creatures that can be kept in large and suitable cages. The facilities for getting such animals surpass those of any similar institution, as Messrs. Chas. Reiche & Bro. are the greatest dealers in animals of the world, their expeditions going regularly to different countries in Africa, Asia and Australia, collecting and transporting what can be got there through hunting parties or otherwise. Some weeks ago they received a remarkable collection of Flying Foxes (*Pteropus edulis*) from India, never before brought to America, which are now exposed to view in the Aquarium There being many interesting points in the natural history of these animals we propose to devote a few lines to them.

The bats are generally regarded as models of ugliness, alarming weak-minded persons when seen to hover in the dusk over their heads, and exciting undefined ideas and fears as to their forms and intentions. For this reason it is interesting to take a close look in safety at the largest kind of these remarkable animals. All of them are to be found in a hanging position; the hind legs, ending in strong, hooked claws, cling to slender sticks fastened near the top of their cage, and the rest of their body is more or less enclosed in the wide, folded wing that forms the great peculiarity of these animals. This wing is really odd, both in form and character. The whole animal kingdom does not possess its equal. There are long, thin, articulated bones which pass through the whole of it like the threads in fantastic spider webs.

Whoever for the first time sees it will hardly believe that this wing, when closely examined, shows the same arrangement of its osseous parts as our arm, or as the fore foot of any other mammal. But look at it when expanded and you will be surprised to find a small upper arm, a somewhat longer fore arm, and attached to the latter a hand with five fingers, the length of which is simply enormous. You might suppose that at least the number of phalanges, *i. e.*, the small bones forming the parts of the fingers, might be larger than that of our hand, but you will find that on the contrary none but the fore finger has three phalanges, while all the others have only two of them. But do not mistake the bones of the middle hand, the so-called metacarpal bones situated between the wrist and the fingers, for phalanges, for they resemble the latter very much, being almost as thin and certainly much longer than these.



FLYING FOXES,

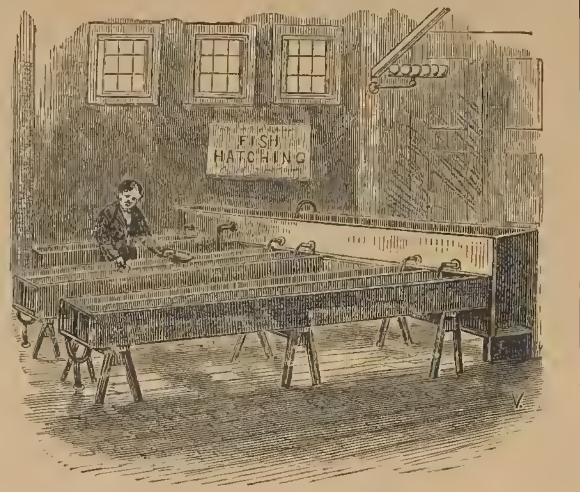
The hind legs are not as fully enclosed in the wing as the fore legs; the feet are totally free, thus enabling the bat to use the five strong hooked claws of each as a means to fasten its body to the branches of trees. When you see it hanging you may observe another interesting fact, by comparing the whole position of the animal with that of any other vertebrate animal under the same conditions. Take a bird, for instance, or imagine a calf or pig hanging in such a way that its toes seize a horizontal pole, and you will find that every animal under such circumstances presents the front side where the Flying Fox shows its back. It follows that the legs of the bat must be bent in some peculiar way, or the manner in which they are fixed to the body must be different from that in other animals. You will discover this by looking occasionally at the skeleton of a bat. Besides the claws just mentioned there are two other claws on each side of the wing, a larger one at the far projecting thumb and a smaller one at the index or fore finger, both of them used for climbing. It is remarkable that some birds exhibit similar formations; as, for instance, a large kind of long-legged South American Wader, the Aniuma, as the Brazilians call it (*Palamedea cornata*), which has strong horny sheaths covering the tips of two fingers, far projecting at the wrist of the wing, and used as effective weapons.

But now examine the wing itself, or rather the soft skin forming its principal part. If you could touch it you would find it to be of extreme tenderness, yet tenacious and elastic like India rubber, and soft and warm like the most delicate human skin. It has been found out by recent investigations that these skinny wings not only perform the function of flying, but constitute the largest and most sensitive organ of touch which is to be found in nature. It has numerous tender nerves, ending in thousands of peculiar organs which closely underlie the roots of the delicate hairs spread all over the skin. By means of this great number of organs of touch the animal is sensitive to the gentlest motion of the air, and is thus actually able to "feel" a body while it is still a foot distant. This explains why bats never fly against windows like birds or insects —why blind animals find their way about just as well as seeing ones, and how they can move in dark subterranean grottoes and caverns as well as in broad daylight. Is not this a most remarkable peculiarity? We have here one of the great marvels of nature—the utmost perfection of a sense—almost incomprehensible to our understanding; yet it is not to be doubted, be it ever so singular, for it has been proved by numerous experiences, just as firmly as the utmost sharpness of a dog's power of smelling, which is alike unattainable to our faculties.

The body of the Flying Fox is covered by soft, woolly hair, of an agreeable brown and yellow color. The elegantly shaped head has moderately long ruffled ears, brisk eyes and an acute muzzle, resembling the head of a neat Italian greyhound; hence the name.

It is very interesting to see the animals feed. The solid food, consisting of fruit, boiled rice or tender meat, is taken by one of the hind feet and the claw of one thumb, brought into convenient position and, half hidden by the wing, hanging on the other foot, they devour and press it, so to speak, into the upper regions. Every rule of nature seems to be set at defiance. They are very fond of water, fight with a clattering noise for it, and lap it with their extremely long and thin tongue.

Flying Foxes are perfectly harmless creatures, feeding in their natural state on fruit and insects, and having in this respect nothing in common with the abominable blood-sucking vampires of South America. But in spite of all interesting and even handsome details the observer is hardly able to overcome the impression of their ugliness. We are too much accustomed to see beautifully-shaped and colored birds and insects to appreciate, from an exterior point of view, the experiment of nature to extend the body of a mammal to that of a bird. The mammal is most adapted to movements on the solid earth, and shows the greatest accomplishment of its form when built expressly for this purpose; as, for instance, in the body of cats or of hoofed animals, such as the antelopes. The mammals moving in air, water or underground, exhibit a greater ugliness the more their organization makes them fit to live in these surroundings.



FISH CULTURE AT THE AQUARIUM.

The apparatus in use in the Aquarium for fish culture is of the latest and most approved pattern, and consists of a large wooden reservoir divided lengthwise by a partition, in which are placed frames covered with a woolen screen which filters the water before it passes over the eggs. The hatching troughs, five in number, are placed with their heads abutting the reservoir and are supplied by brass cocks. In the troughs are placed frames covered with wire cloth, which, with the wood work, and in fact every part that the water comes in contact with, is coated with coal tar, which not only keeps the wire from rusting, but also prevents the jelly-like sap that always appears in new pine wood when under water, from exuding, while it also is a barrier to any vegetable growth upon it.

The eggs are laid upon these wire screens, of which several layers can be used in each trough, thus increasing their capacity. Two of the troughs are now filled with young of the California Salmon from three to five weeks old which were hatched where they now lie, from eggs which were presented by Prof. S. F. Baird, the Commissioner on Fisheries for the United States. They were obtained from his Salmon breeding ranch on the McCloud River, California, in charge of Mr. Stone, the Deputy Commissioner. This variety of Salmon is called by Naturalists the Salmo Quinnat, and from its being capable of passing through water that in Summer reaches a temperature of 80 degrees Farenheit on its annual migration from the sea to its fresh water breeding grounds above, and which would kill its congenor of the Atlantic Coast, is more valuable than the latter for stocking all our rivers south of the Connecticut. Many millions of the eggs have been taken, hatched and distributed by Prof. Baird in the past two years, but as it requires three years for this fish to reach maturity and return to the place where it was deposited, it is too soon to see the results yet, though many young have been caught during the first year that they remain in fresh water.

The eggs are obtained from the living fish by pressure of the hand upon the abdomen, and such is the delicacy of touch and knowledge of condition acquired by an expert that a fish is seldom killed by them, and Mr. Mather states that he has taken eggs from the same trout for five years in succession without injury to them. After the eggs are taken in a pan that has been merely wet, a male fish is manipulated in the same manner over the eggs and in a few minutes after the addition of a little water, the fecundation is complete and the ova is placed in a trough where it remains for three or four weeks, until the eyes can be distinctly seen and all the unimpregnated ones picked out, when they are packed in a box with a layer of fine, living moss, and a layer of eggs alternately until full—this box is then packed in a crate of hay or box of sawdust to keep it from changes of temperature and sent by express to any part of the world. The eggs of the California Salmon are the largest now handled by fish culturists, measuring nearly one-third of an inch in diameter, and as the eggs of any fish average about one size for each species, they are measured to find the number of thousands taken.

It takes from forty to sixty days to hatch a Salmon egg, according to the temperature; a high one, say 70 degrees, hatching very quickly but leaving the fish weak. The best temperature is that of the spring water in which they are laid, perhaps, from 45 to 50 degrees. After hatching, the yolk of the egg remains attached to the abdomen for about thirty days, and at first is so large that the little embryo cannot swim with it, but it is gradually absorbed and when all taken up the Salmon takes food for the first time. This rule is good for all the varieties of Salmon and Trout. Some fish, as the Whitefish and Shad, can swim as soon as hatched, although the sac is attached in the same manner.

Another trough contains 25,000 eggs of the Lake Whitefish, and 15,000 eggs of the Cisco or fresh water Herring, which were presented by Mr. Geo. Clark, one of the Michigan Fish Commissioners, and a recent addition of the eggs of Whitefish, Lake, and Brook trout from Mr. Seth Green, Superintendent of Fisheries for New York, has been made, to be followed in February by the Land Locked Salmon from Maine, the gift of Prof. Baird; these are all winter-spawning fish and hatch slowly on the trays. Shad eggs require an entirely different treatment, which will be explained in a future number of the Journal. It is the intention of the Manager of the Aquarium to stock some of the rivers with the fish hatched here, thus making it useful as well as instructive, and a valuable adjunct to the Fish Commission, and to this end he has engaged the services of the well-known Fish Culturist, Mr. Fred. Mather, to superintend this Department, for which he is well qualified by his long experience as a breeder of trout for a long period at Honeoye Falls, N. Y., and his work of Salmon and Shad hatching for the past three years for the Virginia, and United States Fish Commissions.

This is one of the most interesting features of the Aquarium, both to the Naturalist, the Embryologist, and the casual visitor. The newly-hatched fish is so transparent that the beating of the heart and circulation of the blood can be seen with the naked eye, and the development from the embryo to the perfect fish observed from day to day, and a wonderful transformation it is, for at first the little creature is as unlike the parent fish as a tadpole is unlike a frog; the mouth which at first is only fitted to pass water to the gills is changed so as to take food, and the embryonic fin which, rising in the middle of the back, runs around the tail to the anal fin, is absorbed, leaving the true fins more and more distinct each day. A few years ago Prof. Agassiz discovered that the Salmon had a second heart situated in its tail which was most visible at the third day and disappeared about the tenth.

It is expected that Salmon will be ready to take food at about six weeks old when the sac will have been entirely absorbed; they will then be in condition to find their own living in the streams if put in such spring creeks as are chosen by the parent fish as a place of deposit for the eggs.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

We wonder if there are many of our young friends who will be sorry to learn that the Aquarium *Journal* will only come out once a month after this. It would take too long to tell all the reasons why it is best to do this, and so you must be content to take it as it is.

Now we have something to say about those compositions about Whales, and the prizes we gave. You will remember that when the prizes were offered we said that the compositions must all be ready before a certain time. Now, since that time we have received several good compositions, but they came too late to publish.

We are now going to offer another prize, and this time it will be for the best two compositions about Seals. Those who have been to the Aquarium know what bright and funny creatures the Seals are. Well, we want you to tell us all about them, and the one who tells the most and tells it best shall have a fish globe and gold fish, and the one who does next best shall have a book.

Your compositions must not have more than five hundred words, and they must be written by yourself alone. No boy or girl need write who is over twelve years of age.

Boys, if you will look over the compositions on Whales, you will see that the two which got the first prizes were written by girls. What do you think of that? and girls, you must try and win again just to show the boys that you can beat them every time. Now, these compositions must all be sent in on or before the 12th day of February, and you can send them directed to the Editor of the Aquarium Journal, corner of Thirty-fifth Street and Broadway.

On writing these compositions you must try to tell all that you can and to make what you say so interesting that when others read them they will see that Uncle Octopus has got some bright nephews and neices, and that in giving these prizes he is doing a good thing. Try to write plain and don't forget to cross your t's and dot your i's. Begin at once and remember that nothing pleases an editor so much as to have a prompt contributor. Your obedient

Uncle Octopus.

MARGERY'S RACE WITH THE TIDE.

BY MADGE ELLIOT.

Down to the beach went Margery,
 One sunny day in June;
The wild rose blushed, the blackbird trilled
 His very sweetest tune
And with the bird, as loud and sweet,
 The child sang merrily;
For well she loved the wondrous things
 That loved the wondrous sea.

Amongst the sands gay pebbles lay,
 And, lined with softest blue,
The dainty mussel-shell she found,
 And dainty scallop too;
And rare sea flow'rs, and living stars,
 All shining bright and clear,
And strange green weeds, and jelly-fish,
 And many a horseshoe queer.

And as the sun was sinking low,
 And evening shadows fell,
Two soldier-crabs—both homeless ones—
 Seized on an empty shell.
"I saw it first," cried one, "'tis mine;
 I claim it as a right."
"You'll find a *wrong*," the other said,
 "When we begin to fight."

And on the head he gave his foe
 A most tremendous whack;
Off went his claw—he tumbled o'er
 Quite helpless on his back.
And while he wildly kicked the air,
 The victor said "tis well;
You crowed too soon;" and turned about
 And wriggled in the shell.

Just then, as Margery burst out
 In laughter at the fray,
A wave ran up and touched her feet,
 And murmured "Speed away—
The tide is in." She quickly fled—
 The sea began to moan—
And with her young heart beating fast,
 She leaped from stone to stone.

The chasing waves closed o'er her path—
 Straight followed her the tide;
But, thanks to Heav'n, she safely reached
 Her anxious mother's side.
And then she turned and looked behind
 And said a little prayer.
No flow'rs—no stars—no *beach* she saw,
 But water everywhere!

We have received the following interesting letter from one of our young nephews who lives in Staten Island, and who shows his interest in the *Journal* by sending these facts for us to give to our young readers. Thank you, Master Townsend, and your Uncle Octopus is mighty glad that you were not caught by that Shark.

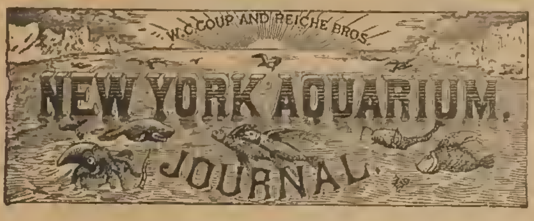
Uncle Octopus—Dear Sir:—At Clifton, Staten Island, beyond Vanderbilt's Landing, in front of the house of a Mr. Silva, was a bone of a large Whale, one end imbedded in the ground, in which was inserted an iron ring for tying horses. The tradition was that the bone came from a whale stranded or captured in our waters. This may have been from the one exhibited many years ago.

That a Shark has been exhibited on Staten Island I know. In the old steamer Wave's dock, then plying as a ferry boat to and from Staten Island, I was bathing one afternoon, when I was warned to come out. Perhaps it was well I did, for after a few minutes I saw his gluttonous majesty pass under one of the bridges of the dock, and he looked so villainous that I was glad to be ashore. In the course of an hour one of the fishermen had a shark hook out from the end of a long line or rope, baited with a porgy, and a buoy on the dock ready to be cast overboard if he took hold. He bit, was hooked, and darted off like mad. The line soon ran out, the buoy was cast off and went sailing out in the bay amongst the quarantined vessels. The fishermen manned a boat and had a long, vigorous pull to get him. After towing him ashore they killed him and exhibited his body on the dock—admission $6\frac{1}{4}$ cents; and when decay ensued roped him alongside the pier in the water, and when a visitor came pulled him up. He was exhibited nearly a week, and was a profitable speculation for his captors, although very offensive to the nostrils of the last admitted to see him. He was, I think, 9 feet long.

Capt. Kettletas, a giant of the South shore, was taking in at half tide his fyke net, and had lifted the outer stick when he saw a Shark rapidly approaching. He made for shore as fast as he could, but before his Sharkship could turn or stop himself he grounded. It then came the Captain's turn for an attack. He ran into the water, seized the monster, dragged him on to the beach and finished his existence with the fyke stick, by beating his head to a jelly. No one on Staten Island, save the Captain, could have done it. He was, I think, 11 feet long.

The Captain, who has lived all his life on the Island, never knew of but one life being lost by Sharks, and that one a negro boy who attempted to swim ashore from a boat anchored in Princess Bay.

Respectfully yours, C. H. T.


W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL

W. S. WARD, Editor.

NEW YORK, JANUARY 24, 1877.

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Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

The endeavors which have been put forth by the manager of the Aquarium, Mr. W. C. COUP, to favor the interests of popular education, are bringing about the desired result. As the Aquarium was a novel institution in America, it is not altogether surprising that at the outset a certain degree of doubt should have prevailed as to its actual character and the value of its claims. So soon, however, as the public became aware by actual observation of the nature of the enterprise, words of approbation, encouragement and approval, were received from every quarter. From the press particularly did the management receive a grateful recognition and to their sincere, repeated and favorable notices much of the immediate success of the enterprise is due. No sooner were the doors thrown open than the opinion gained ground that to the children of our city should be granted the privilege of visiting this marine world, and that any move in this direction should be met more than half way by the heads of our educational institutions. Prompted by a sincere desire to further the cause of popular education, and wishing to gain for his pet scheme a rank among the educational agents of our land and time, Mr. COUP at once expressed not only his willingness but his determination to secure the attendance of the children of our public schools. When this desire of the manager became known many gentlemen, whose names have been identified with the cause of popular education, signified their approval and, in certain instances, addressed to Mr. COUP such letters and words of endorsement of the Aquarium as should be sufficient to gain for it the high rank which the manager covets. Among the recent visitors to the Aquarium was our distinguished citizen Mr. W. C. BRYANT, and so charmed was he with the Aquarium itself and so convinced of its value as an educational agent that he addressed to the Naturalist of the institute the letter here given, and which may serve to enforce the claim which has been made by the manager.

The measures which have now been taken to give practical force to the manager's wishes are of a nature to secure the desired end. A gentleman of culture and experience has been specially engaged to visit the public schools of the city and organize visiting classes, which, accompanied by their teachers, shall visit the Aquarium and under the guidance of their instructors be informed regarding the structure and habits of the many rare forms here displayed. In addition to this effort in behalf of the children, others have been made with a view to heightening the interest of the Aquarium as a school of Natural History. During the last two weeks Professor EBELL, an instructor of acknowledged experience, has been engaged in delivering an illustrated course of lectures on Natural History subjects, while measures are far advanced to give a definite form to the free educational department. Following Professor EBELL will be a second series of lectures on animalcule life illustrated by the magic lantern. As an evidence that these additions are for the sake of advancing the cause of science, it should be known that no extra charge is made for these additional attractions, but that they are given free to the audiences assembled.

Mr. BRYANT's letter is as follows:

NEW YORK, Dec. 20, 1876.

DEAR SIR:—I have been much interested in a visit which I lately paid to the Aquarium of Messrs. COUP & REICHE, where you occupy the post of Naturalist. It deserves a high place among the expedients for popularizing knowledge. One might learn from it in two hours, I think, more of the peculiar forms and habits of the creatures inhabiting the water than one could learn in as many weeks from books. That the collections of land animals, which everybody makes a point of seeing, are valuable means of instruction, all admit. The realm of water occupies more of the earth's surface than the region of land, and the creatures by which it is peopled vie with those of the land in number and diversity of shape and habits; but unless they are brought together with great pains and expense, and placed in some well-contrived receptacle, they cannot, except in regard to some well-known species, be made the subject of actual and close observation.

Such a receptacle is your Aquarium, which is on a much larger scale than I expected to find it. It has, I am told, in the respects of light and dryness of situation, some advantages over the public Aquariums of Europe. I did not know, till I visited it and put myself under your guidance, that there is a free reading room connected with it, supplied with the scientific periodicals, and opening into a naturalist's laboratory, where casts are taken of the most remarkable creatures of the Aquarium when they happen to die, and other processes are carried on.

It seems to me that one of the most important offices of this Aquarium is to give the pupils of our public and private schools a distinct idea of the multitude and diversity of the tribes of living things by which the waters of our planet are peopled. Whatever new and strange is seen by young eyes makes a deeper impression than when seen later in life. After having walked along the ranges of cells constantly supplied with running water, in which these creatures are lodged, the young student feels that he has formed a sort of acquaintance with them, and reads with more interest the story of their peculiar habits and remembers it more accurately.

I hope, therefore, to see the Aquarium more generally frequented than it now is by the pupils of our schools, under the direction of their teachers, assured as I am that the visits they make will result in an increase of knowledge.

I am, Sir, very truly yours,
W. C. BRYANT.

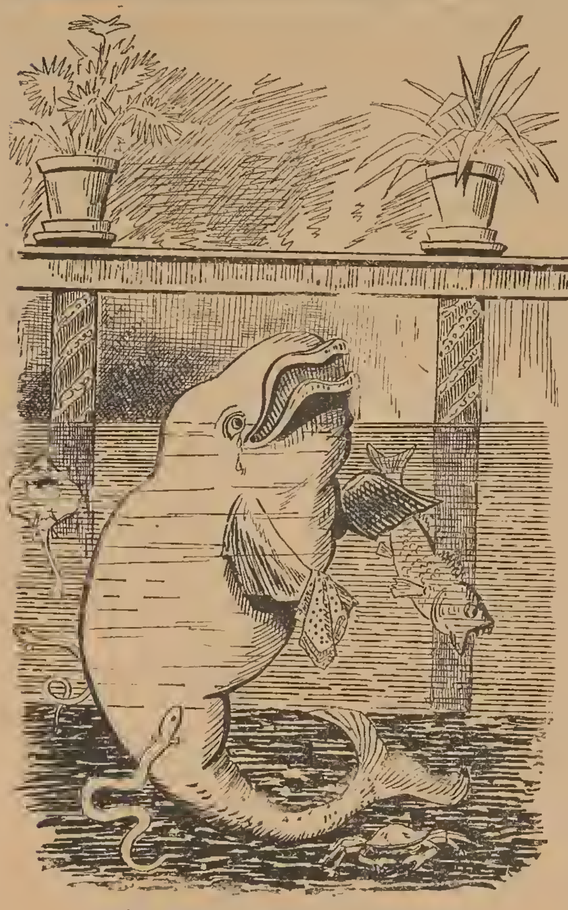
OUR NEW PUMP.

In our introductory description of the Aquarium, attention was called to the fact that the hard rubber pump used in circulating the sea water was procured in England, since up to the present time no such complicated piece of mechanism had been made of this material in America. In this instance, however, as in many others, where American genius has been called into action to accomplish special ends, we find that had there been time to wait there would have been no need to call upon our English cousins to help us.

Within the last month there has been placed in the Aquarium a hard rubber pump of American manufacture, which can justly be claimed to excel in construction, finish and relative capacity for work any yet constructed abroad, and hence, in commending the genius and enterprise which has accomplished this end, we do so with a certain degree of pardonable national pride. The iron work for this pump was made by the Knowles Pump Company, whose pumps were recognized as superior to all others at the Centennial Exhibition. The hard-rubber or vulcanite pump, cylinder valves, &c., were made by the Rubber Comb Company of College Point and the principle is that of the KNOWLES Pump though the material is hard-rubber.

This pump which deserves to rank as one of the attractions of the Aquarium, has been given a place of honor on the right of the main entrance, and any visitor who has an eye for mechanical novelty and good workmanship, would do well to examine it.

In accordance with the determined purpose of the Manager of the Aquarium to render the institution as complete as possible in the variety of marine forms exhibited, expeditions have been, from time to time, despatched to distant quarters to procure any object of interest which could be obtained. Few of the visitors who stand in front of the Aquarium tanks and express their delight and wonder at the strange and rare creatures there exhibited, are aware of the nature of the efforts which have been made to secure them. With the history of the whale and the story of its capture our readers are familiar, and elsewhere we give a second and equally interesting story of the efforts put forth by Mr. HOLDER to procure a Shark or Devil Fish, along the coasts of Florida. Were the season more advanced it would be possible to procure either of these remarkable creatures nearer home, but in order, if possible, not to delay their capture any longer, it was determined in the face of many doubts and discouragements to send a special messenger to Florida. Though the result of his efforts were not favorable, yet the history of his trials is an interesting one and will serve to enforce the claim put forth by Mr. COUP, that he means to spare neither pains or expense in his endeavor to forward the interest of the Aquarium.



THE WAIL OF THE WHALE.

The lights were all out—it was midnight—
The fishes were all fast asleep ;
When groans from the Whale broke the silence,
And a voice rose as if from the deep.

The Fish Frog, awoke from his slumbers,
For a moment with ire turned pale ;
But he smiled as of yore when he listened
To this heart-rending wail of the Whale.

"Here am I, who have roamed the broad ocean,
Under watch kept; yes, more under *Ward.*
Shut up in a tank for a prison,
Indeed by a *Coup* I am barred.

Fish and Eels I am fed by the bushel,
As if they could *eel* up my woe.
'Tis not in my food I'm de-*fish*-ent,
That I come to the surface to 'blow.'

Look there at that lazy Sea Lion,
Whom I hate to *sea lion* about.
He's free. Why? To quote from Dundreary,—
'That's something no fellow finds out.'

I've scalped my poor nose on these glasses,
But to fly my attempts are in vain.
What's the use of these Tweed-like endeavors,
When *panes* only add to my pain?

There's a Saw-fish not very far from me—
I'm afraid he'll escape from his tank ;
If so, some fine morning they'll find me
With my body sawed up into plank.

The Devil Fish glares at me fiercely ;
He's wild and ferocious they say.
If I ever get into his clutches
There'll be the Fish Devil to pay.

I miss ye, O floes of the far north,
O icebergs from me far away,
But one nautical berg's left to hear me,
That's Bergh of the S. P. *Sea*—A.

But my vengeance shall be a severe one ;
They'll find that I'm far from a dupe.
My ancestor swallowed *one prophet*—
I'll swallow *all profits*—of Coup.

P. B.

THE AQUARIUM.

PART I.—ITS FORMATION AND MANAGEMENT.

Of late years it has become almost a fashion to cultivate water-plants, and to establish aquaria, not only in private houses—on a small scale—but in magnificent and expensive buildings, and with all the attendant conditions of committees, boards of directors, and shareholders. With these great establishments we have little to do at present. We visit and admire them ; and we think that the difficulties to be overcome in arriving at the perfect balance of animal and vegetable life, so as to make one dependent on the other, are a study which must certainly inculcate sanitary principles in the minds of all who have to do with them. Without scientific knowledge on the part of the managers, these great establishments could not exist ; and without some apprehension of the principles which regulate all life, the humblest little aquarium, be it only a stickleback and a bit of water-weed in a pickle bottle, must disappoint its owner. A vessel of water containing plants and animals must be looked upon as a little world ; it may, in fact, be so constructed as to have no communication with the great world in which it exists, and of which it forms a part, and yet all its inhabitants live and prosper. If we put a living fish into a jar or globe of water, it dies in the course of a few days, unless the water be changed ; but if we put it into cold boiled water, it dies in a few minutes ; and no amount of fresh cold boiled water will keep it alive. If, however, we put into the water some plants which naturally grow there, and get them established so that they do grow, our fish will live for any length of time without a change of water. How is all this? What caused the death of the fish in the boiled water, and why does it live with the growing plant? These are problems which *must be* understood and solved by all who wish to keep a healthy aquarium. Moreover, the same principles apply to any collection of water plants and animals, whether they live in the sea or in fresh water, and the same laws must be obeyed. The animal, whether it be a gold-fish, or a cod-fish, or a many-colored sea-anemone, has need of fresh air, and its life depends on the presence of oxygen in the water, which it appropriates and which freshens its blood, just as much as we who live in the air require a supply of the same life-supporting gas. All water, therefore, to support life, must contain the gas called oxygen. Naturally it does so, as it descends from the clouds in the form of rain, or bubbles up from the earth a sparkling spring, or rolls down to the sea in rivers, forming the great ocean itself. It never loses its oxygen gas, save as it is used up by the animals that live in it, but which is again supplied by the numerous plants which bathe and grow in its depths. We may give our fish a good supply of pure fresh water full of oxygen, but after a while the oxygen becomes exhausted and the fish dies ; so by boiling water, the necessary oxygen gas is expelled from it, and it cannot support life.

But now we find that plants growing in the water remedy all this, and if properly and skillfully managed in a fresh-water aquarium, will render it unnecessary to change the water for many months, perhaps years. This can easily be understood, if we take a water-plant in a jar of water and place it in the sunlight for a few hours. We soon see little streams of sparkling bubbles rising to the surface of the water—these little bubbles consisting of pure oxygen. The leaves of all growing and healthy plants give off oxygen, the great source of the life-sustaining power not only of the atmosphere, but of the water. We now see why fish will live in water with growing plants, and die without them. But the mutual relation between plants and animals, as carried on in the world, extends even farther than this, and is not altered at all because they live in water. Not only do the plants produce oxygen for the animals to live on, but they appropriate and use up in their own tissues the carbonic acid gas thrown off by the animals. Unless this mutual arrangement existed, both plants and animals would die. Carbonic acid, which is poisonous to animals, is absorbed by the plants—it is composed of carbon and oxygen—and plants have the power of separating and using the carbon for their own substance, and letting go the oxygen.

Thus we find in a jar of water a true microcosm—a little world, in which all the changes go on which are necessary for the maintenance of the life of man and animals on the surface of the earth. Our little water-world too—be it even our humble pickle-bottle aquarium—is subject to all the laws of health of which we now hear so much. Over-crowding is one fruitful source of disease and death in our collections, and we must be very careful only to attempt to keep as much animal life as our growing plants are sufficient to supply with oxygen. Experience is the best teacher in these matters, for we cannot so exactly measure the cubic feet of water necessary for the life of a fish, as of air for the life of a land-animal. Even in the best regulated aquatic establishments, death will occur and decomposition set in, which, if suffered to remain, soon spread disaster through the tank. We have scavengers in the air in the shape of vultures and carrion crows; in the water, in crocodiles, sturgeons, water-beetles, snails; and it is necessary to provide some of the latter useful creatures for our aquatic community. In a small aquarium, we would advise some one or two of the varieties of mollusca, such as water-snails; due care, however, must be taken that they confine their appetites to the garbage and decaying matters of the establishment, and do not devour our living plants.

Before [illegible] fully on the management of an aquarium, and giving suggestions as to its establishment, we recall very vividly the early efforts to keep water-creatures living and thriving in our homes as in their own native streams. It cannot be doubted that the first idea was suggested by Mr. N. B. Ward's successful cultivation of plants in glass cases. As early as 1849, Mr. Ward stated at a meeting of the British Association at Oxford, that he had succeeded not only in growing sea-weeds in sea-water, but in sea-water artificially made. This may be considered to be the first step towards the marine aquarium. In 1849, Dr. Lankester succeeded in keeping sticklebacks in a jar of fresh water containing growing *Valisneria* (a water-plant) and starwort; and in 1850, Mr. Warrington read a paper before the Chemical Society explaining the conditions necessary to the growth of plants and animals in jars of water.

Mr. Alford Lloyd, who is a great authority on aquaria and their management, tells us that in 1853 he began to make his earliest experiments with a few small glass jars and an earthenware foot-pan. At that period there was nothing to guide any one as to how they should proceed—neither books nor men ; and so the real lovers of nature groped their way alone, encouraged by every fresh success to new experiments. Well can we recollect the modest glass jars with the gleanings from ponds passed in country rambles—the bits of weed growing in shingle at the bottom of the jar, with the sticklebacks, a water-spider or two, and a few water-snails, which graced and animated the study of a large-hearted philosopher and born naturalist who has lately passed away from us. Dear to our memory also is the row of tumblers of sea-water outside a cottage window-ledge in a small sea-side village on the coast of Suffolk, placed there by the same nature-loving hands, each glass containing a bit of rock or stone to which was attached a bright-colored actinia (sea-anemone), which, under the influence of the light, expanded and glorified itself into an animated flower. Many a group of wondering and admiring villagers has stood examining these beautiful creatures, little guessing that in every pool on their own coast numbers of them blushed unseen and unnoticed! But these tumblers required refreshing every day; and the morning occupation for the children of the household was to bring up a can of fresh sea-water and change the water in each tumbler. After this refreshment came the great exhibition of the day. Each living flower seemed to vie with the other in spreading itself out, in unfolding all its tentacles, and in displaying every variety of color and shade.

By-and-by a foot-bath was brought down from one of the bedrooms, or a large pie-dish smuggled from the kitchen, and the first experiments tried in keeping a marine aquarium. Much vexation of spirit and disappointment ensued. The sea-anemone would die; the hermit-crabs struggled out of their shells and dragged up the growing weeds, and failure resulted after many early attempts. But at last the true balance was found; the weeds began to grow, the animals to live just as the time for departure from the sea-coast was inevitable, and it seemed impossible to transport the now perfect aquarium to the London study. But even this difficulty was overcome; and by means of bottles and cans, and gallons of sea-water, carefully packed, the precious treasures were safely conveyed far away from their native shores, and flourished for many years in an inverted propagating glass, set in a piece of rock-work, in one of the most densely crowded streets of smoky London.

Now that we are surrounded with aquaria, when every great city and nearly every large town has its own aquarium, it is curious and interesting to trace their beginnings. The aquarium in the Zoological Gardens, Regent's Park, was the first that was opened to the public. In May, 1854, it was announced as open, and described by Dr. Lankester in the pages of a London journal; but even then the idea of a marine aquarium away from the sea-coast was thought to be an impossibility. It was only fresh-water plants and fishes that were then to be seen in the Regent's Park gardens. It was Dr. Lankester who first ventured to write, when describing this little aquarium: 'But why should we not have sea-fishes? These are to come. Ere long every inhabitant of London will be able to see what up to the present time has been seen only by the adventurous and sea-tossed dredger, who, casting his net to the bottom of the ocean, has beheld its numerous inhabitants in the freshness of life.' The same enthusiastic naturalist writes also in 1853: 'Who that has passed a stream, knowing that its waters are thronged with life, has not longed to have the power of watching the movements of its swift and timid inhabitants? In this fish-house we see at a glance what days of watching elsewhere would not afford.' Nearly a generation has passed away since these words were written, but how true they have proved to be! The writer of them lived to see his prophecies fulfilled in Britain and on the continents of Europe and America.

We have said that the true principle on which an aquarium should be conducted is, never to change the water, but so to ærate and refresh the original supply as to maintain it always in a pure and perfect state. The water in the Crystal Palace Aquarium is the same that was taken from the sea five years ago; and the same system, with some improvements, is adopted in the Westminster Aquarium. The means used to attain the end in view are several. Not only is great importance attached, both in the fresh and marine tanks, to the healthy growth of plants which afford oxygen to the water; but also active and brisk contact with the air of the atmosphere is found greatly to freshen the water. *Motion* in the water is therefore essential. In the large aquaria, this is insured by an arrangement of tanks, into which the water is pumped, and from which it flows rapidly, circulating through the tanks inhabited by fish. In its passage through the air, it absorbs a considerable quantity of oxygen; and in the smaller domestic apparatus of which we more particularly speak, the same thing is affected by frequently drawing the water up through a glass or gutta-percha syringe, and squirting it back into the vessel from some hight above it, so as to let the jet pass through after having come in contact with the air. Mr. Lloyd says: 'Water in aquaria should be regarded as a practically indestructible medium for the administration of atmospheric air to plants and animals.' At Westminster, the water travels over a distance of nearly three miles between the beginning and end of its circuit, for the purpose of æration.

Perhaps some of our readers may be entertaining the notion of forming an aquarium. It may be in a glass vessel, a globe, or vase placed in one of the window-cases—noticed in a recent article—surrounded with rock-work and growing plants. Nothing forms a prettier or more attractive centre for a window-garden than one of these pools or crystal tanks of water in a state of healthy preservation. Or it may be that the only available receptacle for the aquarium is a large glass pickle-bottle, or a jar such as confectioners use, or even a finger-glass. Well! more living organisms than one observer could well describe in a year may grow, and live, and flourish in the smallest of these vessels, especially if attention be paid to the microscopic inhabitants of the water, whose name is legion. In dirty situations and in smoky towns, it will generally be necessary to cover the top of the aquarium with a piece of glass or muslin, to keep out the 'blacks.'

The first thing to be done in the formation of a fresh-water aquarium is, if possible, to establish the plants—to place them in suitable soil at the bottom of your tank, and leave them undisturbed, exposed [illegible] light, under the water, until they begin to grow, and the little active bubbles of oxygen are seen rising to the surface of the water. We have grown *Valisneria spiralis*, water crowfoot, the starworts, the various species of Chara, and the Canadian water-weed (*Anacharis alsinastrum*) in profusion. The soil best to plant such in as have roots, is clean river-sand mixed with pebbles. Such plants as Confervæ and others which float on the water and do not take root in the soil, do not, of course, require planting. After choosing your plants from such as you may collect from rivers and ponds in any country ramble, plant them, and cover the surface of the ground with bits of rock, pebbles, or anything that is suitable and in harmony with the rest of the arrangements. Do not put sea-shells into a fresh-water aquarium, or artificial objects where all should be natural. Then fill the vessel with water very carefully through a funnel or syphon, so as not to disturb the soil and the roots of your plants.

The same caution has to be observed in establishing a marine aquarium, which, it must be confessed, is altogether a task of more difficulty than a fresh-water collection. The weeds must then be introduced growing and attached to the stones on which they have naturally established themselves. The fronds and sprays of sea-weed washed up by the tide and left on the shore are of no use, and will only decay and injure the water. It is growing and liking vegetation that we want. A selection of the pretty red sea-weeds so common in rocky pools, with the bright green fronds of *Ulva latissima* and *Bryopsis plumosa*, give color and brilliancy to a marine aquarium, which is unattainable in the fresh-water colony. But it is not so easy to replace the inevitable losses which must take place in the early stages of a marine aquarium when removed from the sea-side. Let all who are near the coast establish a domestic sea-water pool, and enjoy all the pleasure it affords in watching the development and curious habits of the beautiful creatures who may colonize it. But in towns, unless under very favorable circumstances, a fresh-water aquarium will yield more satisfaction with less vexation, as we know from experience. In order to manage an aquarium comfortably, a few simple instruments should be kept at hand. A little hand-net, which may be bought for sixpence or made for a penny—simply a ring of galvanized wire with a muslin bag fastened to a stick for a handle. This is convenient for catching the creatures, fish or shells, without putting the hand into the water, and it is also useful in removing dead bodies. A pair of wooden forceps, like a pair of glove-stretchers, is also most convenient for the same purpose—to nip off bits of decaying weeds or to catch floating particles in the water. Glass tubes of various sizes may be kept, which act by being put into the water with the finger over the aperture at the top. The tube, until the finger be removed, will remain filled with air; place it over any little bit of decaying weed or particle of refuse, and on removing the finger, the water will rush in, carrying with it the offending object up into the tube. Then a glass syringe or squirt is necessary, with which to ærate the water thoroughly at least once a day, and oftener if possible, by filling it and then holding it high above the tank to squirt the water back again. Some persons constantly use a pan or bellows with an india-rubber tube attached to the nozzle, to propel air in through the water.

We have frequently been obliged to do this when we kept a marine aquarium and perhaps discovered a dead sea-anemone or a little fish under a stone, giving off offensive gases and escaping detection in the midst of the sea-weed. After removing the dead mass, and perhaps the stones infected by it, we have, by thoroughly ærating the water, restored the aquarium to a perfectly pure condition. We are thus particular in giving directions as to the formation of an aquarium, because we know from experience the difficulties that surround first attempts. It is by no means to men of science alone that the study of aquatic zoology is indebted. Amongst the earliest successful attempts to keep water-animals captive in a living and healthy state, were those of ladies in their own homes. When we come to consider in our next article the animals which live and thrive best in aquaria, we shall find our best authorities are ladies who have experimented and surmounted difficulties, and have given us the result of their labors. It was a Scottish lady, Miss Elizabeth Dalyell, who largely assisted her brother, Sir John Dalyell, during his half-century of study of marine animals in Edinburgh from 1795 to 1850. It was a lady who kept a cage of captive cuttle-fishes at Messina in 1842, and wrote a charming book on the habits and ways of the octopus, from her own observations. And the first successful attempt to keep sea-water fresh and unchanged, by the action of living sea-weeds, was made by Mrs. Anna Thynne in 1846. Only two ladies are now alive who are known to have reared captive sea-anemones from babyhood to adult age. For a period of ten years, from 1860 to 1870, but little was done or written, or thought publicly about aquaria; still, we know of households where they were kept and fostered, and of women, young and old, who tended, and fed, and cared for the living pets of their aquaria with as much zeal as others bestowed on the feathered friends of an aviary, and with the additional reward of having apprehended and applied the true principles of science to their small water-world. We propose in our next paper to enter more fully into a description of the interesting inhabitants of the aquarium, fresh and marine.—*Chamber's Journal.*

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It is the only Marine Aquarium in North America, and has already collected an interesting array of illustrations of marine life.—*New York World.*

SHARK HUNTING FOR THE NEW YORK AQUARIUM.

On the day before election in the darkly populated city of Fernandina, Florida, there appeared posted in various public places numerous placards, that gave out the information that a large man-eating Shark was required immediately, and the larger the better. Many were the remarks passed upon the bills, and not a few old-time darkies expressed their belief that it was a democratic dodge to scare the republicans, and on the strength of this the bill near the polls was hauled down. The next day, however, cleared the matter up, and it was found that a party from the great New York Aquarium had arrived with the express intention of capturing a huge Shark or Devil Fish for their large tanks. The season was too far advanced to attempt their capture with nets, so we were obliged to run the risk of a hook and line. We first, however, secured the services of a "first-class" fisherman, who also turned out to be one of the "city fathers," and if his statesmanship does not excel his fishing we tremble for the future of Florida.

The day after our arrival we furnished ourselves with a huge steel hook and chain, a line about two hundred feet long, a very tough steak for bait, and set sail for Tiger Island, a supposed favorite basking place for Sharks. We soon reached it and drove a huge log into the sand as insurance on the line and, having run it out into the stream, sat down to wait. Occasionally a fin would be seen lazily cutting the water, but nothing could induce them to indulge. On the next tide we tried Cumberland Island at different locations, with the same success. Fortune would not favor us, and at last we determined to go further South. Before leaving, however, we drew an immense net, that almost reached from island to mainland, and the result proved the barrenness of the locality, as our only catch was a very small Shark. a fine Porcupine Fish, and a goodly variety of the black Echinus or Sea Eggs. These were placed in a cove to wait for a steamer, but were unfortunately run into by a tug at the dock and completely ruined, and as we could not secure the net for a second trial were obliged to give it up.

Our attention was now directed to Smyrna, two hundred miles south, and after receiving a promising letter from the owners of the schooners that ran between there and civilization, we "up line" and started. Our tank was a huge box, fifteen feet long by four feet wide and three high, and weighed over nine hundred pounds; and upon overhauling the schooner on the St. Johns river we found that our box would almost, if not quite, fill her, and again we were doomed to despair. We were then on the bar of the St. Johns—a "noted Shark resort in the summer"—and as a last chance we determined to try for the one that might have over-stayed his time. On one side a collection of huts have the title of Mayport, and here, on an immense shifting sand bank, we took up our quarters. The first day's efforts were fruitless, but on the third we had a nibble. The boat was hauled half out of water, the line run out about fifty feet and made fast to it, baited with a tempting bass that weighed about twenty pounds; and stretched on the sand in the hot sun we dosed and waited. Suddenly a splash was heard, and the stone that told of bites had disappeared. We rushed to the boat and soon had the line, which was slowly running out, in hand. Whispers of "give him plenty of slack," "cast off the anchor," and "keep clear of the line," were given, and we were ready to sound him. We gave about twenty feet of line, the bait being large, and then, as the line came taut, we jerked the hook into our first Shark. The effort on our part was returned with good earnest. The rope rushed out with lightning velocity; now swaying up and down as the huge fish rushed from side to side; now he cleared the water and shook his ugly jaw in his vain attempts to escape, and showed us that we had what we wanted as regards size.

The boat had been pushed off, and we were going over the bar and out to sea at an unenviable speed, shipping water at every jump. We passed Pelican Bank and then our steed commenced to show signs of fatigue, and we gradually commenced to haul in, and in a few moments more found him close along side and well in hand. A noose was now rigged around his tail, and after a round of thrashing and covering us with water we hauled him along side, head on with the boat, and slowly pulled for home, about two miles distant. This was no easy matter, as a heavy sea was running, which, with the movements of his Sharkship, made it almost impossible to ke[illegible], "head on" and prevent drowning, and before we reached the dock he was so weak that the best medical skill of the Aquarium expedition failed to save him. In this manner we lost several, and after many trials, night and day, we succeeded in hooking one from the dock whereon our tank was placed for shipment. A large boat was borrowed from Capt. **Johnson**, the genial chief of pilots, and filled with water, and our victim placed within in fine condition and watched with jealous care. The steamer Dictator was due in two days, and arrangements were completed to use her pumps, etc. The tank was overhauled and filled. and we bade good-bye, "in expectation," to Sharking. That night it clouded up and grew colder; fires were built for the first time in years; and the sun rose the next morning upon a very much frozen Shark; the ice in our tank was almost strong enough to bear one. We unpacked our bags and baited again, but so cold was the weather that the fish left the river, and we were forced at last to give it up. Others were afterwards secured on Nassau river, but could not be kept; and even if they had been started the continued rough weather on the coast would have ruined all.

We now turned in the direction of Tampa, but as we were about to start I received word that so severe had been the cold on the gulf coast that fish of all kinds, from the Shark to the Angle-fish, were piled upon the beach in immense heaps, and farmers were carting them to the plantations — frozen hard and fast in "sunny Florida."

A fine Octopus or Devil-fish was captured at Cedar Keys, but it succumbed to the climate before it could be placed in the Aquarium. Such a winter has not been known in Florida for thirty years, and has not only interfered with the prospects of the Aquarium, but has laid waste property that time can only replace. In the Spring, when the more beautiful creatures come into shoal water, they will be captured for the Aquarium, and will render its now handsome collection first among like institutions of the world.

C. F. H.

POISONOUS FISH.

The London *Lancet* says:—"We have received a letter (published in a colonial paper) from Dr. Houghton, principal Government medical officer in Sarawak, containing particulars relative to a poisonous fish found on the coast of Borneo, and common to the rivers in Sarawak, which he thinks may prove interesting to the profession. To surgeons afloat it should be a matter of considerable importance. The fish is called the Inkam Buntal, and is by no means pleasant to look at, being flabby and covered with short spines, having the power of blowing itself out in a globular form, and when handled in this state it emits a sound something like a grunt, Some few days before the date of Dr Houghton's letter he was called to visit a number of persons who were reported to be dying. On going io the various houses he found thirteen had been seized with symptoms of poisoning after eating the roe of the Buntal. Three of the sufferers had succumbed to the effects of the poison, and were lying dead. The remaining ten Dr. Houghton was fortunate enough to restore after vigorous treatment, consisting in stimulating emetics, friction of the body, and application of warmth, and cajuput oil in small doses. The appearance presented by those attacked, and who recovered, were dilated pupils, blueness of lips, spasms of throat, contractions of the limbs, stertor, with greatly lowered temperature. In those who died the tongue was white and mottled, the mouth showing a peculiar blueness. The time which elapsed from eating the fish to that of death was from 20 to thirty minutes. In searching for parallel cases it was found that some years ago two sailors were poisoned from eating a small portion of the liver of the same kind of fish (*Tetraodon solandri*) at the Cape of Good Hope, and died in seventeen minutes. Large quantities are eaten by the Malays and Dyaks, who have many peculiar superstitions connected with the mode of cooking, in which, perhaps, may be found the secret of the immunity enjoyed, as a rule, from the effects of the fish. One of the remedies in which the natives have much faith is the curious process of placing the sufferer on a platform of sticks on which the fish is smoked, and keeping up a good fire underneath, sufficiently guarded not to burn the body.

Among the recent features of peculiar interest at the Aquarium, is fresh water tank number 18, filled with Salmon hatched in the Aquarium.

A COMPLETE INDEX OF ALL THE FISH IN THE TANKS

The following tabulated list is designed, with the assistsnce of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised semi-monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER TABLE TANKS.

Tank 1.—Anemones.

Tank 2.—Porgies, Pectens.

Tank 3.—Striped Gurnards, Algae, Toad Fish, Smooth-browed Bull Head, Winter Flounder.

Tank 4.—Sea Raven, Spider Crabs, Rock Crabs, Pectens, Algae, Sea Urchins.

Tank 5.—Wharf fish, or Checsey Black fish, Spider Crab, Pectens, Lebias, Algae, Young Tautog or Blackfish, Cunner, Sea Urchins.

Tank 6.—Star-fish, four varieties, Hermit Crabs, Pectens, Algae.

Tank 7,—Serpula, Living Sponges, Aromias, Bryozoas, Skate Eggs.

Tank 8.—Anemones, four varieties, Algae, Livng Corals, Sea Cucumber.

Tank 9.—Crabs, 7 varieties, Algae.

Tank 10.—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Algae, Young of Edible Crabs,

Tank 11.—Lafayettes, Algae, Little Hermits.

Tank 12.—Sea Horse, Sheepshead Lebias, Algae, Serpula, Periwinkle and Spawn.

FRESH WATER TABLE TANKS.

Tank 13.—Brook Pickerel.

Tank 14.—Young California Salmon.

Tank 15.—Young Brook Trout.

Tank 16.—Yellow Perch.

Tank 17.—Banded Proteus.

Tank 18.—Young California Salmon, hatched in the Aquarium Dec. 4, 1876.

Tank 19.—White Perch.

Tank 20.—Common Pond Fish.

Tank 21.—Long eared Pond fish, and Fresh Water Lobster.

Tank 22.—Hell Benders.

Tank 23.—Common Sun fish.

Tank 24.—Japanese Kingiyo.

Tank 25—Pickerel.

Tank 26.—Brown Cat fish.

Tank 27.—N. Y. Shiner.

POST TANKS.

Tank 28.—Sticklebacks.

Tank 29.—Young Cat Fish, Lobster, etc.

Tank 30.—Dace.

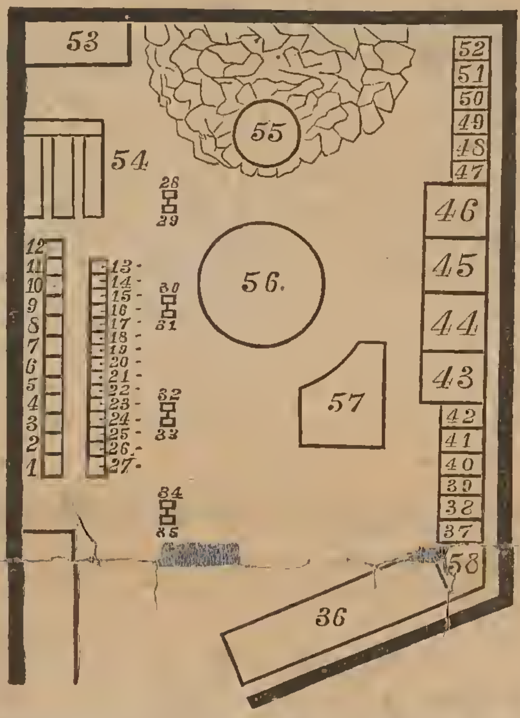
Tank 31.—Algae, Unio, Munnon.

Tank 32.—Fresh water Lobster, Dace.

Tank 33.—Crimson Spotted Triton.

Tank 34.—Black Headed Dace.

Tank 35.—Young Salt Water Actinae, Coral, Algae.



Ground Plan of the New York Aquarium.

SALT WATER SERIES.

Tank 36.—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Spotted Skate, Summer Skate, Spotted Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog.

Tank 37.—Striped Bass, Weak Fish, Codlings, Flounders.

Tank 38.—Five varieties of Star Fish.

Tank 39.—Lobsters

FRESH WATER SERIES.

Tank 40.—California Salmon, Lake Trout, Brook Trout.

Tank 41.— Yellow Perch, Brook Pickerel, Blue Cat-fish, Long-eared Pond fish, common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass.

Tank 42.—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank 43.—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Long finned Chub Sucker, Wall-eyed Pike Lake Pickerel.

SALT WATER SERIES.

Tank 44.—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank 45.—Lafayette Fish, Flounder, Porgies, Young Skate, Black fish, Striped Bass.

Tank 46.—Blackfish, Striped Bass, Manhaden, Lafayette, King Crab.

Tank 47.—Flounder, Tomcod, Toad Fish.

Tank 48.—Lobster, Lady-crab, Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank 46.—Spotted Cod Lings.

Tank 50.—Rock Cod.

Tank 51.—Black Sea Bass.

Tank 52.—Lobster, Striped Bass, Porgies, Lafayette Fish.

Tank 53.—Brook Trout, Salmon Trout, California Salmon.

Tank 54.—Fish hatching troughs.*

Tank 55.—Sea Lion.

Tank 56.—Whale.

Tank 57.—Seals, Otters, Flying Foxes.*

***The Asterisks that follow any of the names contained in the above list, are designed to indicate that the fish thus designated is fully described on preceding pages of the present issue of this Journal. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions.

OUR DRAG NET.

UNSATISFACTORY.

"Have other lovers—say, my love,—
Loved thus before to-day?"
"They may have, yes, they may, my love;
Not long ago they may."

"But though they worshipped thee, my love,
Thy maiden heart was free?"
"Don't ask too much of me, my love;
Don't ask too much of me."

"Yet now 'tis you and I, my love,
Love's wings no more will fly!"
"If love could never die, my love,
Our love should never die."
"For shame! and is this so, my love,
And love and I must go?"
"Indeed I do not know, my love;
My life, I do not know."
"You will, you must be true, my love,
Nor look and love anew!"
"I'll see what I can do, my love;
I'll see what I can do"

◆

The Love of a Big Boy for His Mother.

Of all the love affairs in the world, none can surpass the true love of a big boy for his mother. It is a love pure and noble, honorable in the highest degree to both. I do not mean merely a dutiful affection. I mean a love which makes a boy gallant to his mother, saying plainly to everybody that he is fairly in love with her. Next to the love of her husband, nothing so crowns a woman's life with honor as this second love—this devotion of the son to her. And I never yet knew a boy to "turn out" badly who began by falling in love with his mother. Any man may fall in love with a fresh-faced girl, and the man who is gallant to the girl may cruelly neglect the worn and weary wife. But the big boy who is a lover of his mother at middle age is a true knight, who will love his wife as much in the sere-leaf Autumn as he did in the daisied Spring. There is nothing so beautifully chivalrous as the love of a big boy for his mother.—*Beriah Green.*

J. W. FISKE,

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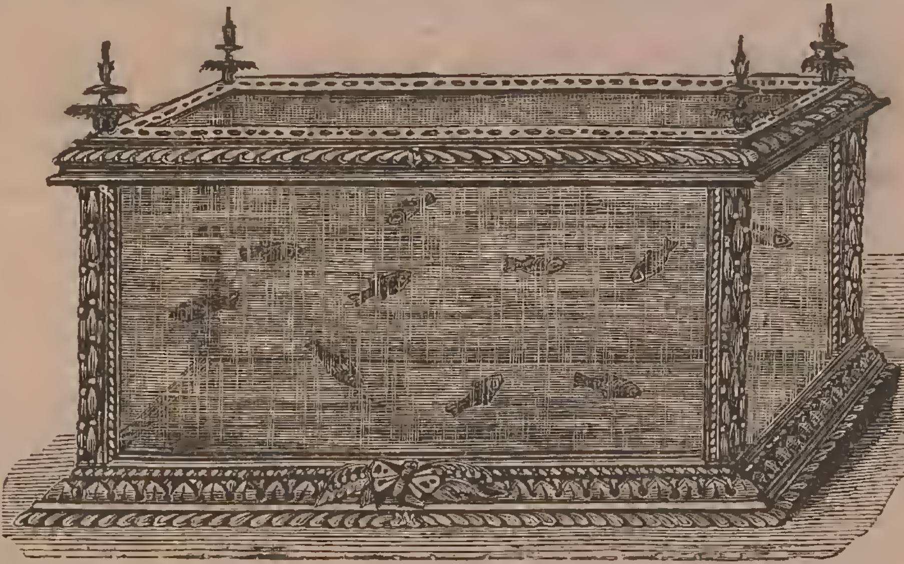
Vases,
Statuary,
Deer,
Dogs,
Lions,



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Chairs,
Tables,
AND OTHER
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Conservatory
Adornments.

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SILK, paragon frame,	- - -	3 50

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Please examine carefully and note the prices.

Any order which you may be pleased to favor us with will be promptly attended to, and if any article proves unsatisfactory you can return it and receive your money again, as all the goods sold by us are warranted to give entire satisfaction. Perhaps it will be proper for us to say that we purchase all our goods for **CASH ON DELIVERY**, *and sell on the same terms. We could not furnish you with goods of the quality and at the prices named in the catalogue, if we gave credit.*

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Good Quality	$ 36 cts.	per Pound
Fine "	48	"
Extra Fine Quality	60	"
Choice "	72	"
Best "	80	"

ENGLISH BREAKFAST TEA.

Good Quality	$ 36 cts.	per Pound
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Extra Fine Quality	60	"
Best "	80	"

UNCOLORED JAPAN TEA.

Fine Quality	$ 40 cts.	per Pound
Extra Fine Quality	60	"
Best "	80	"

YOUNG HYSON TEA.

Good Quality	$ 36 cts.	per Pound
Fine "	48	"
Extra Fine Quality	60	"
Choice "	76	"
Best "	88	"

GREEN AND BLACK MIXED TEAS.

Good Quality	$ 36 cts.	per P
Fine "	48	"
Extra Fine Quality	60	"
Best "	80	"

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Good Quality	$ 36 cts.	per Pound
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Extra Fine Quality	60	"
Best "	80	"

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ROASTED AND GROUND EVERY MORNING.

Good Coffee	18 cts.	per Pound
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Best Quality Old Java Coffee	34	" "
" Plantation "	38	" "

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At $3, $4, $5, and $6 per Gallon.

JAMAICA RUM.
At $4, $6, $8, and $10 per Gallon.

MEDER'S SWAN GIN.
At $4, $5, and $6 per Gallon.

SCOTCH AND IRISH WHISKIES.
At $4, $5, and $6 per Gallon.

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At $3, $4, $6, $8, and $10 per Gallon.

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At $1, $1.50, $2, $2.50, and $3 per Quart Flask.
At 50 cts., 75 cts., $1, $1.25 and $1.50 per Pint Flask.
At 25 cts., 38 cts., 50 cts., 63 cts. and 75 cts. per ½ Pt. Fl.

OLD RYE AND BOURBON WHISKIES.
At 75 cts., $1, $1.25 and $1.50 per Quart Flask.
At 38 cts., 50 cts., 63 cts. and 75 cts. per Pint Flask.
At 19 cts., 25 cts., 32 cts. and 38 cts. per ½ Pint Flask.

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At $1, $1.50, $2 and $2 50 per Quart Flask.
At 50 cts., 75 cts, $1 and $1.25 per Pint Flask.
At 25 cts., 38 cts., 50 cts. and 63 cts. per ½ Pint Flask.

MEDER'S SWAN GIN.
At $1, $1.25 and $1.50 per Quart Flask.
At 50 cts., 63 cts. and 75 cts. per Pint Flask.
At 25 cts., 32 cts. and 38 cts. per ½ Pint Flask.

SCOTCH AND IRISH WHISKIES.
At $1, $1.25 and $1.50 per Quart Flask.
At 50 cts., 63 cts. and 75 cts. per Pint Flask.
[redacted] 38 cts. per ½ Pint Flask.

RRY AND PORT WINES.
and $2.50 per Quart Flask.
s., $1 and $1.25 per Pint Flask.
At 19 cts., 25 cts., 38 cts., 50 cts. and 63 cts. per ½ Pt. Fl.

CANNED GOODS.

Sweet Corn	20	cts. per	Can,	$2.20	per doz.
Succotash	20	"	"	2.20	"
Lima Beans	16	"	"	1.75	"
String Beans	14	"	"	1.50	"
Green Peas	20	"	"	2.20	"
Marrowfat Peas	20	"	"	2.20	"
Tomatoes	20	"	"	2.20	"
Peaches	28	"	"	3.20	"
Quinces	35	"	"	4.00	"
Plums	35	"	"	4.00	"
Green Gages	35	"	"	4.00	"
Blackberries	18	"	"	2.00	"
Raspberries	20	"	"	2.25	"
Strawberries	27	"	"	3.00	"

Superlative Flour	25 lb.	Bag,	$1.40
Croton "	"	"	1.20
Osceola "	"	"	1.00
Ready Raising Flour	6 lb.	Paper,	0.32
Prepared "	3 lb.	"	0.19
Griddle Cake "	3 lb.	"	0.18
Buckwheat "	25 lb.	Bag,	1.12
" "	12½ lb.	"	0.62
" " prepared,	3 lb.	Paper,	0.18
Indian Meal	25 lb.	Bag,	0.62
Oat "	per lb.		0.06
" "	per 7 lb.		0.38
Avena or (Oaten Grits)	2 lb.	Paper,	0.18
Graham Meal	per lb.		0.05

Wheaten Grits	12 cts.	per Paper.
Farina	12	" "
Hominy	22 cts.	per 5 lb. Paper.
Samp	24	" " "
Paper Shell Almonds	40 cts.	per lb.
Prunes	14	" "
Currants	10	" "
Valentia Raisins	14	" "
Loose Raisins	16	" "
" "	$3.00	per Box.
Layer Raisins	3.50	"
" "	20 c.	per lb.
Patent Candles	46 cts.	per lb.
Sperm Candles	36	" "
Patent Wax Candles	30	" "
Blueing	8 cts.	per Bottle.
"	8 cts.	per Box.
Ultramarine Blue	25	" "

Baking Soda	14 cts.	per lb
Saleratus	14	" "
Cream Tartar	60	" "
Sal Soda	2½	" "
Royal Baking Powder	50 cts.	per 1 lb. Can.
" " "	25	" ½ "
" " "	15	" ¼ "
Sea Foam	50	" 1 "
"	25	" ½ "

Mustard (Loose)	44 cts.	per lb.
" (in Can)	56 cts.	per 1 lb. Can.
" "	28	" ½ "
" "	14	" ¼ "
French Mustard	15 cts.	per Bottle.
Sardines	40 cts.	per ½ Box.
"	22	" ¼ "
Worcestershire Sauce	68 cts.	per Pt. Bottle.
" "	38	" ½ " "
Bordeaux Oil	80	" Qt. "
" "	44	" Pt. "
Superior Starch	10 cts.	per lb.
Satin Gloss Starch	12	" "
" "	62 cts.	per 6 lb. Box.
Corn Starch	12 cts.	per lb.
Starch Finish	25 cts.	per Box.

Family Soap, (by the Box)	7 cts.	per lb.
" " (2 lb. bar)	16 cts.	per Bar.
" " (3 lb. bar)	24	"
" " (4 lb. bar)	30	"
Century Soap	8 cts.	per Cake
Zircon "	8	" "
Sapolio	8	" "
Hand Sapolio	8	" "
American Laundry Soap	8	" "
Saphia	8	" "
Pride of the Kitchen	8	" "
Castile Soap	14 cts.	per lb.

Table Salt	10 cts.	per Box.
"	10 cts.	per Bag.

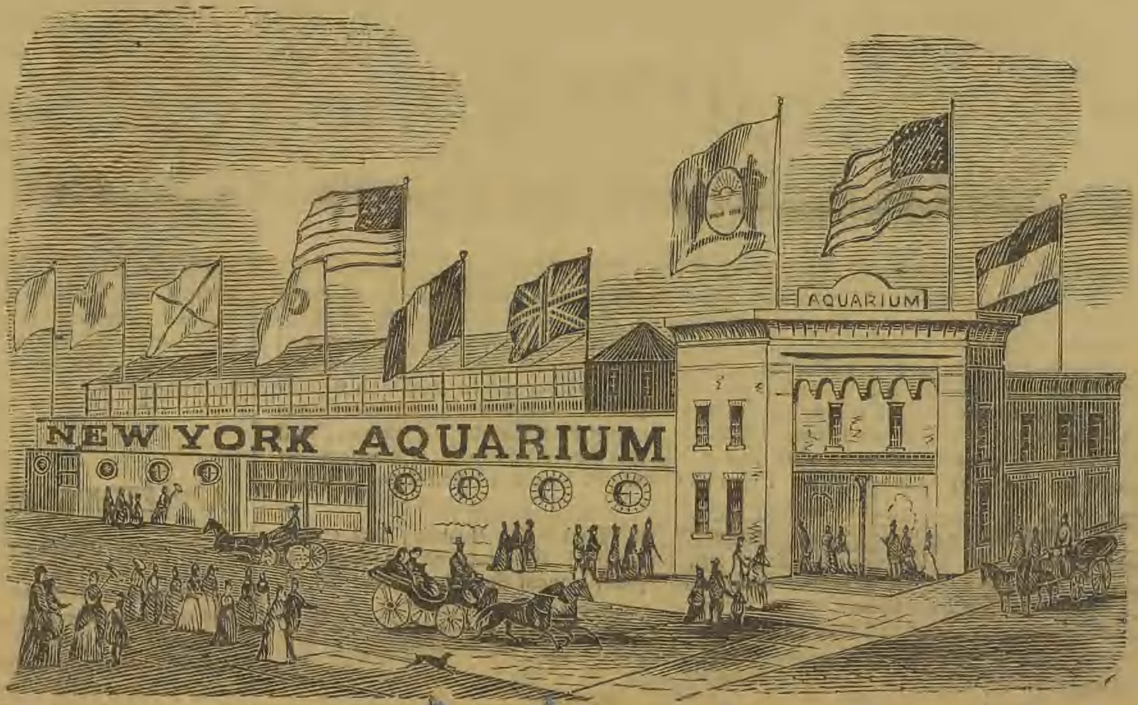
SCHEPPS.

Manna	1 lb. Paper,	25 cts.
Desicated Cocoanut	1 lb. "	34 "
" "	½ lb "	17 "

Bakers Chocolate	40 cts.	per lb.
" Cocoa	40	"
" Broma	44	"
" Crushed Cocoa	40	"
" Cocoa Shells	16	"
Sweet Chocolate	30	"

Carolina Head Rice	10 cts.	per lb.
Rice	9	"
Maccaroni	18	"
Tapioca	10	"
Barley	8	"
Sago	10	"
Whole Cloves	56 cts.	per lb,
" Allspice	26	"
" Pepper	26	"
Carraway Seed	20	"
Cassia	40	"
Citron	32	"
Mace	12 cts.	per ounce.
Nutmegs	10	"
Black Pepper	10 cts.	per ¼ lb. can.
" "	18	" ½ "
" "	34	" 1 "
White Pepper	14	" ¼ "
" "	26	" ½ "
Cayenne	14	" ¼ "
Cinnamon	14	" ¼ "
Ginger	10	" ¼ "
Cloves	16	" ¼ "
Allspice	10	" ¼ "

New York Aquarium



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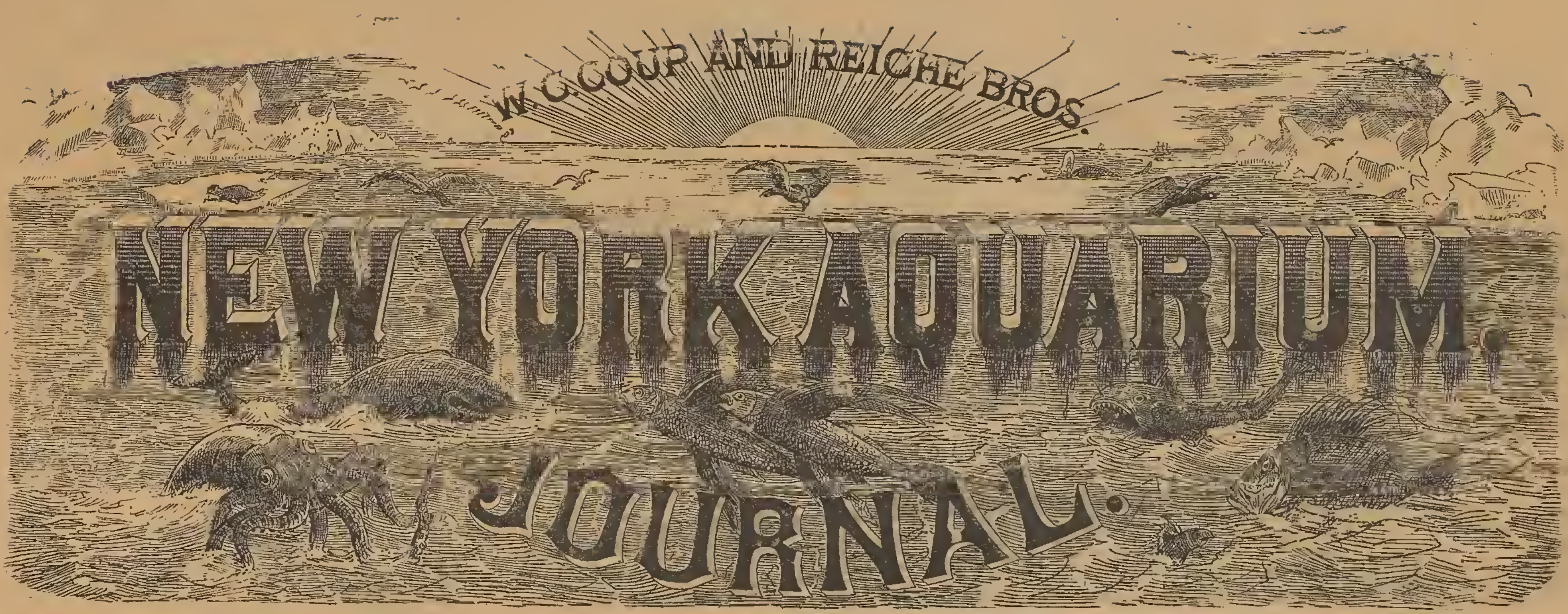

W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM JOURNAL.

Published Monthly at the New York Aquarium, cor. 35th Street and Broadway.

VOL. 1. NEW YORK, MARCH, 1877. NO 8.

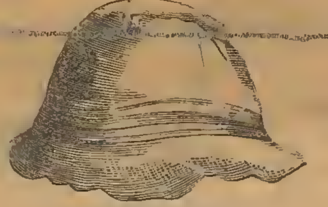
SEA ANEMONES.

BY W. S. WARD.

"God quickened in the Sea and in the Rivers,
So many fishes of so many features,
That in the waters we may see all Creatures ;
Even all that on the earth is to be found,
As if the world were in deep waters drowned.
For Seas (as well as Skies) have Sun, Moon, Stars ;
(As wel as Air) Swallows, Rooks and Stares ;
(As wel as Earth) Vines, Roses, Nettles, Melons,
Mushrooms, Pinks, Gilliflowers and many millions
Of other plants more rare, more strange than these,
As very fishes living in the seas."

Whether it be more a flower than a fish, we leave it for the anatomist and botanist to determine, if indeed there be yet any disciple of Linneus who dares to claim for the intelligent Anemone a place in the catalogue of plants. Although writing to and for those who have doubtless availed themselves of the pleasures and privileges afforded by a visit to the New York Aquarium, we shall yet venture briefly to describe the structure of the anemone as there displayed, before referring to its habits and haunts.

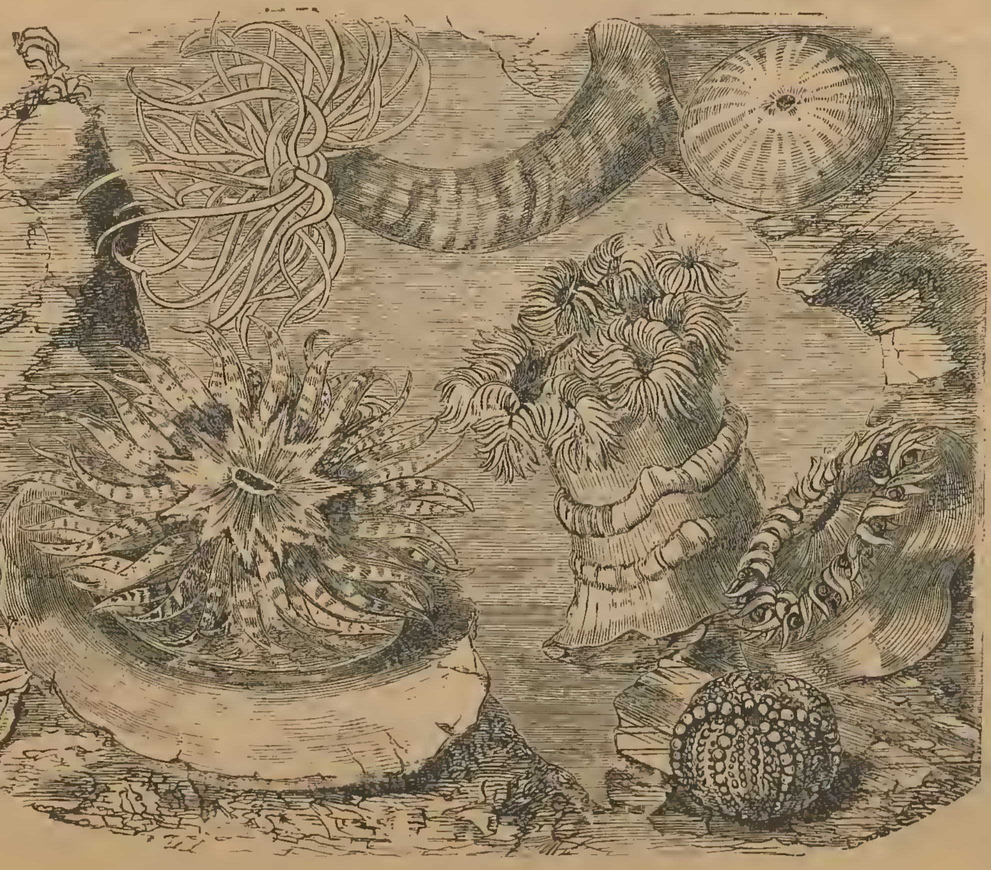
When closed--that is, when in a state of repose and inactivity — the anemone is nothing more than a gelatinous dome, as though the contents of a tea-cup full of jelly had been placed in a bucket of water to cool, if indeed jelly is ever cooled in this odd fashion. Conceive of this dome slightly depressed at the apex, and widened out into a thin curtain at the base, and we have the full-grown anemone at rest. When in this position were it possible to bisect the creature without disturbing its equilibrium, the transverse section would disclose a sac within a sac, as though one were to press the sides of a hollow rubber ball with a pencil until they had closed about it. Now conceive of the upper interior edge of this depressed portion lined with minute petal like tentacles, susceptible of a marvelous power of expansion, while at the base of the cavity—the point where the pencil rests—is an orifice through which an entrance to the lower and exterior sac is obtained, and we have in rude outline the peculiar features of the anemone. Let it be understood, however, that in order to comprehend in a satisfactory manner all the peculiar and complex structural features of these strangely beautiful creations, the reader must become a student as well, and should the writer succeed in awakening sufficient interest in the subject to incite to a more thorough investigation, the result will be an abundant recompense both to teacher and taught.


ANEMONE—Closed.

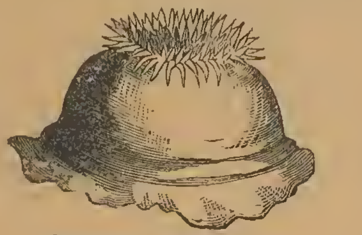
So faithfully has the artist portrayed, in the accompanying illustration, the variety and peculiar characteristics of these sea-flowers, that it is only needed to direct attention to the results of his efforts as shown in these truthful portraitures of the living forms, in order that the reader may become familiar with the subjects now under review.

Here, grouped in a miniature cavern of the sea, we have such a cluster of white, golden and red blossoms, that were the real objects before us, with their varying tints and petal-like tentacles, we could readily sympathise with the discomfiture of the bee, observed by Jonathan Crouch. Attracted by the beauty of a dahlia wartlet anemone which was just covered by a film of sea-water in a rock-pool, it buzzed straight into the embraces of the "crass," mistaking the tentacles for petals, and paying for the error with its life, in a manner we shall soon learn, for the remorseless fingers clutched it in their grasp and transferred it to the ready stomach.

Although possessed of the


A GROUP OF SEA-ANEMONES.

power of locomotion the anemones are oftener content to remain fixed to the friendly rock upon which, as minute spores, they first found a resting place. As we have already observed, in a state of absolute repose the smooth and bright-colored dome is all that is to be seen. Let us watch, however, the occurrence of subsequent changes—their method and purpose. Possibly a stray sunbeam has found its way into the rocky cavern, or through the window of the Aquarium, till its rays, as they illumine the polished dome, adding to it a new and rare lustre, serve also to remind the creature that feeding time has come. Slowly the depression at the summit of the dome widens and enlarges until along its interior edges begin to appear the delicate fringe-like tentacles. Just as in the budding of the opening daisy the parting of the stamens discloses the fringed edges of the long imprisoned petals, so the awakening of its marine namesake is marked by the appearance of these delicate tentacles, till at last the summit of the dome is capped with a grateful cluster of blossoms on a crimson or golden stalk; for while this expansion of the summit was in progress a like extension of the base has taken place, till the dome is now a column, often several inches in hight, and crowned with a flower-like capital.


ANEMONE—Partially opened.

The time has now come for making those special observations, the result of which will be to justify the Anemone in its claim for a place among the so-called intelligent organisms as distinguished from the unconscious plant and flower.

The first special peculiarity to be here observed is that indicated by the constant activity of the tentacles. Unlike the petals of the daisy, which move only when shaken by the wind or in response to the salute of the butterfly or bee, the tentacles of the Anemone are in a state of constant activity, and with what purpose will soon be detected.

A shrimp, itself in search of food it may be, or possibly wishing to bask in the same sunbeam which animated the anemone, is seen entering the sacred precincts of this marine garden. As it approaches our newly-awakened blossom, we discover that the action of the tentacles becomes so violent that they mark the centre of a miniature whirlpool of which their motion is the origin, and into whose abyss the marauder, unless more wary, will soon be engulphed. And now we are to witness a phenomenon so strangely interesting and novel that, but for seeing it with our own eyes, we might well be pardoned for questioning its reality; and hence, in order the more willingly to accept the fact as about to be demonstrated, a truce must be declared until the observer, by a more critical examination of a peculiar structural feature of the anemone, has the better fitted himself for his duties as a spectator of the coming conflict. If in the course of our previous hurried dissection of the dome we had brought to our aid a powerful magnifying glass, there would have been discovered distributed about the surface of the dome, or along the sides of the tentacles, numberless minute transparent vesicles in which were coiled, like tangles of fine sewing silk, delicate thread-like filaments; these are known by the descriptive name of lassos, and the animal so controls them as to throw them out at will, projecting their outer ends to a distance of several inches beyond the range of the tentacles themselves. Each of these thread-like filaments is armed with a set of barbs or spines which in their turn have the power of emitting a secretion so venomous that even if the prey escape the entanglement of the lasso the sting of the barb will result fatally.

Let us now verify these observations by witnessing the conflict between the anemone and its prospective victim.

Allured by the brilliant hues of the waving tentacles, or unwittingly yielding to the attraction of the miniature whirlpool, the shrimp ventures at last a wave too far. With an activity and skill which can but betoken the presence of a determined will and intelligent purpose, the discharge of the lassos begin, the water about, above and below the victim becomes milky in hue, owing to the sudden invasion of the numberless white filaments. Stung by the poisonous barbs, and entangled in a net of silken threads, the body of the hapless shrimp is drawn limp and paralyzed to within reach of the outstretched and eager tentacles; once grasped by them and the end has come. The same wavy motion which first enticed and then drew the body to within reach, now projects it over into the central vortex, that proves to be the mouth of the anemone. The closing of the flower now begins, and so rapidly is it accomplished that the change from a blossom to a bulb may be witnessed before our eyes.

DAHLIA WARTLET—Expanded.

All is again quiet without and around, though the centre of activity has not been changed since the processes of digestion now going on within the dome are no less active and efficient than the movements which preceded them. After the digestible portions of the shrimp have been assimilated the remainder is discharged, either from beneath or through the orifice by which the entrance was effected. So fastidious is this creature that this waste furnishes a fruitful supply to other less dainty neighbors.

In the Aquarium the visitor, if present at feeding time, may witness in all its details the operations here described, save that in artificial feeding the food is oftener composed of minute portions of meat or mussels, which are so supplied as to fall within range of the current producing tentacles and thus preclude the use of the lassos. As illustrating the ravenous nature of the anemone as well as its abundant capacity, it may be stated that in addition to shrimp they devour small crabs, whelks, and other shelled molusca, assimilating the digestible portion and rejecting the remainder. Dr. Johnson states that he once had brought him an anemone that might have been originally two inches in diameter and which had somehow contrived to swallow a valve of *Pecten maximus* of the size of an ordinary saucer. The shell fixed within the stomach was so placed as to divide it completely into halves, so that the body stretched over it had become thin and flattened like a pancake. All communication between the interior portion of the stomach and the mouth was thus prevented, and yet instead of emaciating and dying of atrophy the animal had availed itself of what had undoubtedly been a very untoward accident to increase its enjoyment and its chance of double fare. A new mouth, furnished with two rows of numerous tentacular, was opened up in what had been the base and led to the under stomach.

ACTINOLOBA DIANTHUS.

At this point the critical naturalist should be informed that the writer, claiming the poet's license, has taken the liberty of ascribing to a whole class peculiarities of habit and structure which belong to certain species alone, as for instance the anemones which possess in their highest development the lasso cells belong to the large British genus termed *sagartia*, the name being derived from an ancient race of warriors called Sagatians, whose weapon in war was a rope lasso.

So acute are these creatures that it has been observed that if one of the occupants of a tank is being fed its comrades, though in a distant part of the same tank, will become aroused and evince, by the action of the tentacles, an evident desire for a like attention. As a further evidence of an intelligent will it should be stated that in certain cases where their exposed position is likely to attract attention the anemones cover themselves with fragments of shell, sea-weed and gravel, and thus evade discovery.

Although the anemones, as a class, are not migratory in their habits, yet they possess the power of locomotion in such a degree that soon after a colony of them had been placed in one of the Aquarium tanks several had climed up the polished glass sides by means of the slow contractile motion of the expanded base. This method of locomotion is oftenest seen in the *actinoloba dianthus*, of which many beautiful specimens are to be viewed in the tanks of the New York Aquarium. These, according to Lloyd, have been known to travel from three to six inches in twenty-four hours, not very rapid progress it is true, and yet wonderful enough when apparently accomplished by the aid of no special organs of locomotion. It is also claimed, though open to verification, that certain species turn themselves over and walk on their tentacles. A second and better authenticated method of locomotion is that due to the inflation of the interior in such a manner that it shall act as a bladder or buoy. It is said that by means of an air cavity at the base, containing a vesicular or spongy disk, made up of air cells, the *Actineta* lies on the water with its base uppermost and in this position is carried along by the winds and currents.

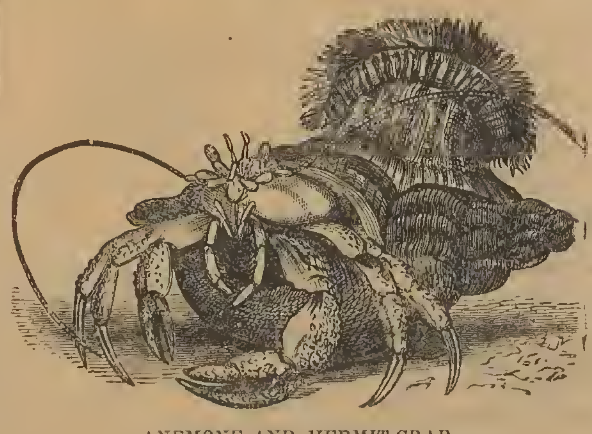
In pursuing our inquiries into the question of birth and propagation, we find in the anemone a most fruitful theme for study and observation. There appears to be in this class no distinction of sex, and the authenticated methods of multiplication are two-fold by the ordinary means of ova and by the detachment and subsequent development of portions of the parent stock. In the case of development from the ova or egg, Agassiz states that the eggs, when first observed, hang on the inner edges of the interior partition, from which they fall into the inner digestive cavity, and from thence are discharged through the mouth. This embryo is semi-transparent, oblong and entirely covered with vibratile celia, by the aid of which it swims or is drifted to some rock, to which it becomes firmly attached, and upon which its subsequent growth and development are accomplished. Certain species are extremely prolific, a single individual bringing forth as many as three hundred young a day. The second, and by far the most curious and interesting method of multiplication, is that accomplished by means of detached portions, which may be described as follows:— When a large anemone has remained adherent to one spot, and at length choses to change its quarters, it does so by the slow movement above indicated. But it frequently happens that small irregular fragments of the extended base are left behind, as though torn off. These fragments, however, contain the germs of an individual life, and first contract into a general circular form; then the dome-like development follows, and thus, step by step, the semblance of a creature is assumed, till from the severed piece a new anemone is formed, and this agrees in type with its parent. One observer states that, having cut off a minute piece of the base of a sea anemone, the detached portion immediately seceded from the parent, and in three weeks became a perfect actinia. Pieces from this were again removed in like manner, until in the end fourteen living and fully developed specimens were obtained from the original.

ANEMONE FROM BAY OF FUNDY.

In the case of the ravenous specimen above described, that swallowed the pecten, we observed how readily the body adapted itself to the new conditions, and this is also illustrated in other ways. Not only will removed portions grow and develop, but their place will be made good on the original member by a subsequent restoration of the detached portion.

In proof that in this record no attempt is made to exalt the wonders of these strange creatures, it should be known that these very processes are to be constantly observed in the anemones at the Aquarium, which are now multiplying at so rapid a rate that a removal of the excess will soon be necessary.

Though enough has been already shown of the habits and structure of the anemone to assure for it our special favor, yet there still remains that which cannot fail to heighten our interest. We refer to the distinctive habits of what is known as the *Sagartia purasitica*. Of the peculiar ways of this creature pages have been and might still be written. It is the regular habit of members of this special group to attach themselves to the shell of a hermit-crab; by this means they not only are assured of a frequent change of location, but are enabled to render some service in return. In his work on 'Animal Parasites and Messmates," Van Beneden states that an understanding appears to exist between the crab and its living burden, so that the anemone lives off from the food captured by the crab; and it has actually been observed that in certain instances, when the crab is about to change into a new shell, as is its custom, he manoeuvres with all delicacy to make the anemone change also. Again, referring to the evidence of Lloyd, to whom the public are indebted for the successful establishment of grand aquaria, we learn that the *Adamsia palliata* lives on the shell occupied by the hermit-crab, but not mounted on the dome of the shell but fastened to the edge of the mouth, with its base over-lapping. The hermit thus carries it with the tentacles downward, which thus act as a broom sweeping up the food before it. Another strikingly interesting fact is that this anemone always accompanies the same species of hermit-crab, and the two are never found separated. When the hermit changes its shell it carefully peals off the anemone from the discarded one and transfers it to the new abode. Nor is it as a comrade alone that the anemone distinguishes itself, for in certain instances, their extended sac or stomach acts as a retreat and place of refuge for some of the higher forms of marine life. Lieut. de Crispigny is said to have observed a sea-anemone (*actinia crassicornis*) which lived on such neighborly terms with a malacopterygian fish, the *Premas biaculiatus*, that the latter actually penetrated into the interior of its protector. Here shut in by the hedge of tentacles, the fish lives in perfect security for months.


ANEMONE AND HERMIT-CRAB.

Having indicated by indirect reference to the beauty of the many species of anemones we may briefly refer to certain special forms, among these the Dahlia Wartlet may be recognized for its intimate resemblance, both in form and color, to the flower from whence its name is taken. The *Actinoloba dianthus*, of which a very rare collection may be seen at the Aquarium, is regarded as among the most favored and prolific. The Beadlet, Snake-locked and scores of others each deserve attention on account of some special charm and beauty either of tint or structure. As to size, the full grown anemones vary according to species. The Thick-horned (*Tealia crassicornis*) occasionally expands to a diameter of ten inches, while the delicate little *Edwardsia carnea* measures but one-tenth of an inch even when fully grown.

As to age no absolute record is at hand, though one taken from the sea by the late Sir John Graham Dalyell, in the year 1828, is still living. During this time it has given birth to over one thousand young, and is still as active as when captured forty-eight years ago.

In this instance, as in many others of like kind, there was no method for determining the age of the anemone at the time of its capture; hence the record is of value chiefly as showing how well they thrive in captivity.

Although at the risk of the reader's patience we have claimed his attention so long, yet in ending it is with the confident assurance that to the naturalist, or to him who would become one, the theme will prove one of the most engaging of all those which Nature has offered for the contemplation of her enthusiastic disciples.

W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM JOURNAL.
W. S. WARD, Editor.

NEW YORK, MARCH, 1877.

THE NEW YORK AQUARIUM JOURNAL *will be published monthly at the Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

The event of the month gone by in the history of the New York Aquarium, is the death of the whale, and in reply to many inquiries regarding the probable cause, we would direct attention to the following report of Doctor WEISSE, Professor of Anatomy and Surgery in the Medical Department of the University of New York. From this report it appears that the animal succumbed to a disease to which fish are not alone subject. The examination was a thorough one and the information obtained through it regarding the anatomical structure of the cetacea will be of permanent value. The judgment of Drs. WEISSE and ARNOLD respecting the cause of death naturally led to inquiry regarding the reason of the pneumonia and the conclusion is reached that the pneumonia from which the whale died was undoubtedly caused by a sudden lowering of the temperature of the water in which the animal was confined at the Aquarium. Some weeks ago it became necessary to clean the whale tank, and its inmate was hoisted into the air while the foul water was drained off and the tank scoured. The new supply of water forced in was nearly twenty degrees lower in temperature than that to which the whale had been accustomed. Within a few days the animal was noticed to be affected, and it was supposed that the quality of the food supplied to it, and which consisted solely of live eels, was to blame for the change. It was not until the dissection and analysis that the real cause of its death was known. Sincerely as the management regret the lack of experience which resulted in this loss, yet it proves to have been not without great gain to science, while the public may prepare for the early announcement of the arrival of a second, and possibly still "bigger" specimen of these rare monsters. The following is the official report to which we have alluded :

REPORT OF THE EXAMINATION OF THE DEAD BODY OF ONE OF THE SPECIES BELUGA. FAMILY DELPHINIDÆ, ORDER CETACÆ, CLASS MAMMALIA.

Zoologists describe the Beluga dolphin as about twelve feet in length and three in diameter; body cylindrical, with somewhat of a hump in the middle of the back. The head terminates in a blunt snout; the lower jaw presents eight conical teeth on each side; the upper jaw nine on each side; the eyes small. The pectoral fins are proportionally small to the body. The tail fin is bilobed, the lobes triangular in shape, converging and united at their bases, with their apices widely separated. The tail fin is flat, its greatest diameter from side to side. It is this peculiarity of the position of the tail fin which distinguishes all species of the cetacæ or whale order of animals from fishes, as the tail fin of the latter is always vertical. The Beluga is distinguished from others of the dolphin family by the absence of a dorsal fin and the non-existence of a groove. separating the head from the snout. These characters approach it more closely to the true whale, and hence it has been called white whale. The adult Beluga dolphin is of an ivory white, the young being spotted with gray. It is native to the Arctic seas, but is found along the Atlantic coast as far south as the coast of Labrador. The specimen of Beluga dolphin under discussion was found to be a female, of a light slate color; head in good proportion to the body; snout blunt, with no groove separating it from the rest of the head; eyes very small; blow hole single at the top of the head; slight hump or rise of body at the middle of the back; fins at the sides of the thorax, being rudimentary upper extremities ; the tail fins flat, bi-lobed, each lobe triangular, united at their bases, and the apices widely separated, the tail thus forming the shape of a V. The animal was found to measure nine feet eight inches from snout to tail tips, three feet between the tips of fins; body breadth twenty inches; head breadth thirteen inches. As the body had been injected January 28, 1877, with a strong solution of chloride of zinc, all the tissues were found in a perfect state of preservation, not emitting the slightest unpleasant odor. On removing the skin which, with subjacent fat, was an inch and a half thick, the muscles were found red and healthy looking, the sternum being carefully removed, the thoracic viscera were exposed; the pericardium and pleura, as also the heart, presented no evidences of disease having existed during life. The lungs, weighing twenty-two pounds, presented the appearance of a lung that had been affected by chronic catarrhal pneumonia. On opening the abdomen the contained viscera were found in a perfect state of preservation, as though the animal had been dead but an hour. The liver weighed nineteen pounds. The four stomachs, the fifty-seven feat of intestines, the pancreas, the kidneys (two pounds each), the generative organs, were all free from any lesions of previous disease; the spleen, however, presented some evidences of previous disease which were unimportant. The cause of the death of the animal was pneumonia involving both lungs, and it had existed some time before death. The anatomical differences between the organs of the animal under examination and man were all recognized, as follows:—Four distinct stomachs, the absence of a gall bladder, and the non-existence of the cæcal portion of the intestines, the peculiar and beautifully lobulated structures of the kidneys, and the double-horned uterus. The further dissection of the body was left for subsequent examination. Specimens of the organs were kept for preservation in the Museum of the Medical Department of the University of the City of New York and the American Veterinary College respectively. The skeleton will be mounted for preservation.

* * *

Our grateful acknowledgements are due to CAPTAIN MORTIMER, for certain recent valuable contributions to the Aquarium. Foremost among these are the Salamanders, exhibited in the glass case on microscopic tables. In addition to these interesting reptiles are the English roach, fresh water tank 20, and several rare star fish and sea urchins, which were dredged from a depth of thirty fathoms, off the coast of Delaware.

The Exhibition by Mr. Starr.

Among the recent attractions of the Aquarium the exhibition of animalcule forms on the screen by the aid of the oxy-hydrogen microscope, can but engage the interest of the visitor. Mr. STARR is one whose long experience in this field has rendered him without a rival in the work for which he is engaged. Not content with granting to the visitors a full display of the visible marine forms, Mr. Coup has supplemented them by affording an opportunity to study the "invisible" and if, in the contemplation of the larger forms, abundant theme for study have been afforded, the still greater wonders which the advances of optical science have brought to light, will be found to far exceed all others yet displayed.

* * *

A DEATH BLOW.

BY JOSEPHINE POLLARD.

"Dear me!" said the Whale, as he flapped his tail ;
  "Dear me! and my goodness gracious!
I'd give a good deal for a hearty meal—
  I've an appetite most voracious.
I swim and I dive, but, as I'm alive,
  So small is my present cupboard,
It is hard to find any food to my mind,
  And only for this I blubbered.

"A *coup de main* I must use, 'tis plain,
  Or else there will be a riot ;
This Aquarium to an end will come
  If they don't attend to my diet.
The Roach I'll scoop with a sudden swoop,
  The Cod in my jaws I'll coddle,
The Bass and the Perch I'll not leave in the lurch,
  Or nod at the Bull-head's noddle.

"I'll raise a fuss with the Octopus
  And the Hip-hip-hop so lazy,
And the great flat Skate shall search for bait
  Until it is nearly crazy.
The Crabbed crew and the Mollusks, too.
  I'll grind to the finest powder ;
And whatever I choose I'll take and use
  In making a nice Fish Chowder.

"As a *coup de grace* I will break the glass
  That renders my spirit frantic,
Till the fishes all, both great and small,
  Shall think they are in the Atlantic.
With my fin I will scratch an official dispatch
  In language so sharp and aquatic
That the Seals shall declare, with a comical stare,
  That the Whale is quite *mal*-o-dramatic."

Then off with a plunge, and a snort, and a lunge,
  And various other gyrations,
He circled around in his narrow bound
  And wept for his lost relations ;
Till his brain grew wild, his temper oiled,
  And his Whalebone interlining
Began to contract—'tis a solemn fact !—
  And hinder the creature from dining.

All over the whale began to turn pale,
  With hunger and cramps to vex it,
And his *coup de grace*—it came to pass—
  Was rather a hasty exit!
When the big Fish died the Crocodile cried
  Great tears for man's inhumanity ;
Said it was a disgrace and a very clear case
  Of Emotional insanity!

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

You will first notice, my young friends—that is, those of you who read this *Journal* every month—that your Uncle Octopus has been promoted, and this is how you may know it. When anybody who has anything to do for a paper in the way of writing, succeeds so well that he pleases those for whom he writes, the manager often tells him that his writings can be printed on the Editorial pages. Now the two Editorial pages of the *Aquarium Journal* are the fourth and fifth, and you see we are to have one of these all to ourselves. The time has come for telling who received the two prizes for the compositions about seals, and as in the case of the whale composition we print the best two, and I am certain that you will say that they are both good ones. But boys and girls of New York what are you about? Why, if you will read these letters, you will see that they were both written by boys who have never been to our Aquarium, and so have never seen the queer trained seals which bow and ring bells and climb stairs and all that.

After you have read about the seals, you will come to another letter written by a New York girl, who went to the Aquarium and has taken the trouble to tell us about it. Now Miss Ella Fletcher shall also have a prize for her nice letter. The first prize for the seal composition goes to Master Cozzens, and we wish you could see the beautiful writing of this letter; why your Uncle did not have to put on his spectacles to read it, so plain was every word. Master Brinton, who wrote so well about the whale, is to have a boy's book on Natural History, also, as his composition is as good as the other, all except the writing, which is not quite so plain, and editors like plain writing you know. We cannot end this letter without telling you all, that if you go to the Aquarium at once you will see the funniest magic lantern show that was ever seen and who knows but that you may see pictures of living fish that will be twice as ugly as your

UNCLE OCTOPUS.

PRIZE COMPOSITIONS.

DEAR UNCLE OCTOPUS:

I saw in the January number of your *Aquarium Journal*, that the child who wrote the best composition about Seals would receive a prize, so I will try:

The Seal is an animal which lives principally in the sea, but often comes on the shore or ice-banks to lie in the sun. Its head is shaped somewhat like that of a dog, and it has bright, intelligent eyes. Its nostrils are formed in such a manner that they can be completely closed when the animal stays under water, and opened as soon as it comes to the surface to breathe, and its ears are so formed as to prevent the entrance of water. Some of its teeth are covered with sharp points of different sizes, while the others are long and sharp like those of a dog. The Seal is of great commercial value, yielding valuable fur which is made into cloaks, hats, gloves, &c., and also yielding oil. The Esquimaux hunt it with spears, and bows and arrows. I have heard the story of a man who had the present of a Seal; it soon became very tame, and would eat from his hand. It was very fond of heat, and would lie for hours by the stove; it soon became very friendly with the dogs. It happened that winter was very stormy and cold, and fishing boats seldom put to sea, so fish became scarce, and they were obliged to feed it on milk which it ate in large quantities, but milk was too expensive, so one morning they took it in a boat and went about two miles from shore, where they dropped it overboard and rowed quickly back, but the Seal was determined not to go, but followed them and cried so loud that they took it home again. There are four species of the Seal—the Common Seal, the Crested, the Hispid, and the Bearded Seal. The common Seal is found in nearly all parts of the globe, and is gentler and more easily tamed than the rest of the Seal family, and is quite active on land and very active in the sea. The Crested Seal is found in Arctic America and Southern Greenland, and is the most valuable of the Seal family. It is the most courageous of the Seal tribe, its crest serving as a shield for its head. The Hispid Seal is found in the Polar seas, and forms the principal part of the Esquimaux food. The Bearded Seal is a very bulky, shapeless animal, living in the Polar seas. It measures about ten feet in length, and eighth feet in girth. It is very useful to the Esquimaux, who make a sort of rope from its hide, which is used as a harpoon or spear line in spearing Walrus.

Yours, Respectfully,
FRED. COZZENS,
Cleveland, Ohio.

The Seal is an amphibious animal, that means it can live both in water and on land. There are several varieties; the common Seal is from four to nine feet in length, and weighs from one to two hundred pounds and is found along the coasts of North America and Greenland. The great Seal measures from ten to thirteen feet, and is found on the islands in the Arctic Ocean and on the Newfoundland Coast. The Harp Seal is distinguished by having two marks like two half moons on its back. It varies more in its color than any other seal, so much in fact, that the Esquimaux change its name with its color. It is playful like the common Seal. The Feited Seal is of a grayish-white color and lives in caves. The men that catch them go in the caves and arrange themselves at the mouth and make a noise to arouse them and then they knock them on the head with a club and stun them. These Seals when old never leave a certain place till they die. They have holes in the ice for fishing, but never hurt the sea-fowl which swim on the water in great numbers. The Bottle-nosed Seal is very lazy, the largest having a foot of fat around its body. They are generally found in the seas around the Falkland Islands and the Island of Juan Fernandez. The Seal in general is a timid animal, but if pursued and finding no way of escape it will turn and rush at its enemy and try to knock him down. They used to kill Seals by harpooning them, but now they kill them by hitting them on the head with a club. To the Greenlander there is scarcely any part of the Seal that is not useful. The skin makes his clothing; the fat makes his oil; the meat makes his dinner. Since we bought Alaska from Russia Seals are very plentiful, but we are destroying them so fast that they will soon become scarce again. The fur is very fine and warm and is used for ladies coats and muffs; the hair on the outside is rough and bristly, but this is taken off and underneath is the fine skin, which is dyed usually a very dark brown; the fur of course is very warm because the Seal lives in very cold climates and needs a warm coat as well as the ladies.

GEORGE BRINTON.
Philadelphia.

New York, Feb. 10th, 1877.

UNCLE OCTOPUS—DEAR SIR:

While reading your *Journal*, I observed your wish of receiving compositions from children, and thought I would like to write a short one.

Being one of the many school children who visited the Aquarium on Friday, February 9th, was much pleased to find so much that interested me. On entering the building the first thing that attracted my attention was a crowd gathered around a tank, and making further inquiries found it to be Seals. Oh, what knowing creatures they appear to be. I stood watching them for some time, particularly when the gentleman bowed the Seal returned it, and after each act he had a dinner of small fish. Then again it tapped a bell and looked around so cunning as if waiting a reply. I went to the Centennial Exhibition and there noticed the curious dress of the diver, and did not think it made such an appearance in the water, until having the pleasure of seeing it illustrated at the New York Aquarium. I also feel sure that a person could go there every day, and see something new and interesting. And I wish all children could have the opportunity of doing so. I left the Aquarium very much satisfied with my visit, and hoping to be able to go again soon.

I remain, very truly yours,
ELLA H. FLETCHER.

THE AQUARIUM.

PART II.—ITS FORMATION AND MANAGEMENT.

We will imagine our aquarium healthily established in its vegetation. A crystal globe or tank of bright clear water, with plants of the pretty long-leaved valisneria, chara, and perhaps a water ranunculus floating at the top, all in their healthy growth giving off bubbles of pure oxygen when exposed to the light. At the bottom of the tank is a bed of clean river-sand, with bits of rock or stones lying about, and forming tiny caves or nooks for the retirement of any of the expected tenants of the pool. It has required perhaps a fortnight of patient waiting to accomplish this condition of things, and careful attention in removing every dead or decaying bit of vegetation. The tank has been shaded from too hot a sun, and exposed to the bright light of a warm aspect only occasionally. Were it left in a window with sunlight constantly upon it, the green vegetable matter called confervæ would increase and grow so rapidly as to destroy the other plants, and forming a green shiny film all over the light side of the glass, would obscure it entirely. This green film must be daily cleared away and the sides of the glass polished. A bit of clean sponge tied on to the end of a stick answers this purpose well, and if used daily is sufficient to keep the glass clear; but if the confervæ be neglected, and allowed to establish itself, scrubbing will hardly remove it from the glass. Almost the first inhabitant that is tried in a fresh-water aquarium is a stickleback; he is so easily caught, and is the first game of the youthful British angler. A bit of meat at the end of a piece of string entices him, and having once seized it he never lets go till he is dragged out of the water and opens his mouth to gasp for breath. He very soon accommodates himself to new quarters, but asserts his sovereignty at once, allowing no intruders, and usually commencing his despotic reign in the aquarium by attacking all rivals. It is best not to attempt to establish an aquatic 'happy family' rashly. The mild and pleasant little gold and silver fish live peacefully with their neighbors; but the truculent stickleback is a fish to be wary of in the way of introduction. Let him have a habitation to himself, with one or two of his own species, and he is delightful to watch and beautiful to behold. He will repay you for his disposition. He has all the ways of other fish and many more besides. He and his family are found both in fresh water and in salt. It is almost a matter of indifference to them in which they live. In Yarrell's *British Fishes* we find seven distinct sorts of sticklebacks described, according to their peculiarities, number of fins, &c., and in each case it is mentioned that they are found 'indiscriminately in salt or fresh water,' in every river, brook, lake, and all around our coast from Land's End to the Orkneys.

It is the male fish that is the pugnacious one of his tribe. We have no Amazons among fishes. The habits of the female stickleback would satisfy the strongest opponent of 'woman's rights,' for she grows very fat, never assumes the brilliant colors of the male fish, and remains at home occupied with domestic cares. Her warrior partner, however, does not throw the entire burden of the establishment on his weaker half. After clearing the neighborhood of all intruders, by using his sharp, well-directed spines much in the way that a Chinaman or Japanese wields his knife and rips up his enemies, he sets to work to *build a nest* and to rear a family. Look into your tank; there he is—larger than the rest, clothed like a knight of old in a resplendent coat of mail, glittering with purple and gold. See how his eyes glisten, and how with every movement his colors change! His nest being carefully prepared, he gently allures his mate into it, where she deposits her eggs, and resigns them to the care of the hero of the knightly suit, who watches over them with an anxiety known to few of the males in creation besides the male stickleback. He fans and freshens the water with his fins, and superintends the first exit of the little fry with true paternal interest.. We ourselves have seen, in an aquarium kept by a lady in Aberdeen, a nest built by a fifteen-spined stickleback on a piece of rock covered with fine green sea-weed. For about three weeks the father fish never left this nest save to drive away or destroy all other fish that approached too near. When a stick was put into the water near the nest, the valiant guardian would fly at it open-mouthed and bite it with great fury. But all his care could not save his little ones from destruction. As soon as they escaped from the nest, they disappeared, being mercilessly swallowed in their infancy by other fish, or entangled in the tentacles of the sea-anemones—for this was a *sea*-water aquarium in which they were hatched. Probably the experiment would have succeeded better had the nest been isolated, and all the other inhabitants of the aquarium removed.

Of course, in small domestic aquaria it is best to have small fishes as inhabitants. The tiny gold-fish we have mentioned as being very suitable, and the Prussian carp, found in ponds in the neighborhood of London, though not so bright a fish as the golden carp, has a very lively and pretty appearance. The minnow is a sportive little fish, and is seldom more than three inches long. It is generally to be bought at the fishing-tackle maker's, as it is used by anglers as a bait for pike and other fresh-water fish. The loach and the gudgeon live well in aquaria; we have them both, and have kept them alive and in health for three years. Fish in an aqairium should be well watched, and when apparently sickening, should be removed gently in the hand-net, and placed alone in fresh water, where they will often recover. If they are doomed to die, it is better not to run the risk of their doing so in the midst of their healthy companions. We always have a hospital for our sickly pets.

But although at the first glance at an aquarium one is attracted by the active little fishes swimming amongst the bright green weeds, we who watch them daily, and spend many leisure half-hours in attending to them, in clearing away the overgrowth of weeds, and making subaqueous highways and paths for their better movements, know that the curious water-spider (*Argyroneta aquatic*) with his crystal bubble, the queer little water-flea (*Daphnia*), and the odd family of water-beetles, are even more interesting, because their habits are more obscure than those of the funny tribe. The spider's brilliant bubble, which surrounds his body, enables him to rise through the water and float about at his pleasure. Diving, he constructs a sort of nest at the bottom of the water. When he wishes to take a journey and ascend to higher regions, he inflates his transparent jacket and floats away; and when wishing to remain on firm ground, dispenses with his air-bubble, and looks like an ordinary spider. He is an easy prey to fish, and cannot well be kept with them, though he may often escape for a long time.

The great water-beetle (*Dyticus marginalis*) is a well-known beetle in our ponds and streams. It is the most ravenous of its kind, and will attack everything eatable; even the stickleback is no match for it, and tadpoles it devours by dozens in a day. Its larvæ are as destructive and tyrannical as itself, and have got the characteristic name of 'water devils.' The little whirligigs (*Gyrinidæ*) should not be neglected; they are often seen twirling round like opera-dancers on the surface of the water, and are among the earliest harbingers of spring. Beetles fly at night, and unless the aquarium be covered, some of them may take a moonlight-flitting and be lost. The water scorpions and the water boatmen form pleasant little objects in the water, and the larvæ of various other species of insects may be kept with interest. It is possible also to get a little colony of caddis-worms in their curious little cases, and to watch their habits and ways with much pleasure. But to those who really take interest in matters microscopic, and are furnished with a microscope even of small pretensions, the aquarium will be a costant source of study and delight. The Hydra family, the Polyzoa, &c. may be nursed, and reared, and propagated in very small water space, and are a perpetual supply of interest. Many earnest observers have a microscope so fixed as to catch the surface of the glass of a tank, and to revolve so as to be able to fasten just over any little object to be observed. Diatoms, animalcules, and curious plant-like cells, abound in fresh water, and grow and increase abundantly if left unmolested by larger creatures. *Volvox globator*, a dark green, moving and revolving globe, once thought to be an animal, but now regarded as a plant; and *Euglena viridis*, which some suppose to be a plant, others an animal, and which often gives to water the appearance of grean pea soup. Amongst animalcules, we have the curious sun animalcule, which has the power of suddenly contracting its tentacles, and thus leaping about in the water. The microscope shows that it has no mouth or stomach, but has the habit of pressing food into its substance by means of its tentacles. The 'bell animalcules' or *Vorticellæ*, are likewise too small to be distinguished by the naked eye. In some species, more than one individual is found on a single stem, forming exceedingly beautiful objects under the microscope. The stalks of these Vorticellæ are thinner than the finest spider's thread, and have the power, while outstretched, of instantaneously contracting, so that a large mass, expanding over the whole field of the microscope, suddenly disappears, and, 'like the baseless fabric of a vision, leaves not a wrack behind.' A little patience, and the beautiful creatures will once more reappear to expand themselves in all their beauty. Then we have the *Rotifers*, with their curious cilia, which have the appearance of little wheels ever in motion; and the *Polygastrica* (many-stomached), so cleverly described by Professor Ehrenberg, who, with the most imperfect microscope, made careful observations on this group of animalcules, and determined to his own satisfaction that the little spots in their interior are, iu reality, stomachs. He fed them with a little indigo or carmine, and then these spots became colored blue or pink, showing, as he then thought, that they were *many-stomached*. Recent observers doubt his conclusions, but they are nevertheless suggestive and interesting. Then we have the curious little Hydra in almost every stagnant pool in the summer time, and we have successfully kept a colony of these singular creatures attached to a root of valisneria, which throve well in a long glass vase—a confectioner's covered jar. Well is it named 'Hydra,' after the fabled monster that multiplied its heads as fast as Hercules cut them off, for no cutting up is able to destroy this persistent creature. Every individual fragment very shortly becomes a perfect Hydra, which attaches itself to a bit of stick or a plant, sending out its long semi-transparent green tentacles to clutch unwary prey that may stray towards it. From this very jar we have often taken bits of valisneria leaf, to make a pretty and instructive object under the microscope, for no plant shows so well the circulation of fluid through the cells and tissues of a leaf. Water plants, being of less dense tissue than those that grow in the air, are peculiarly adapted for this purpose.

In furnishing our aquarium we must not forget the scavengers, of which we have before written. Certain varieties of Mollusca—snails with shells, in fact—live plentifully in fresh water, and have large appetites for green weeds. They are most useful in clearing off the growth of green confervæ, which gathers on the sides of the glass when exposed to light; but care must be taken that their grazing is confined to that pasturage, and that they do not extend their rambles to the growing plants in the aquarium. The coil-shells are the best and least voracious of this tribe, and many of the mud shells may be safely introduced. The large mud-shell (*Limneus stagnalis*) is a dangerous fellow, and loves nothing better than a salad of valisneria. When vegetation is too rank in an aquarium, one or two of these fellows will soon clear it off, but they must be removed before the whole is devoured. The beautiful and common marsh-shells, the fresh water mussel of both kinds, the swan mussel, and the pearl mussel, should be in every good collection; and as they lie at the bottom on the clean bright sand, they look very pretty, and have their use assigned to them in the colony.

We will now, however, imagine ourselves at the sea-side, anxious to preserve and bring home some of the living treasures we have gazed at in the rocky pools at low-tide, but which, on being ruthlessly pulled out of their natural element, have withered and died in a few hours. Even the sea-weeds that we collect without injuring or disturbing the roots, droop, and look quite different in our basket, or when spread out on paper, from what they did when floating out in the pool of water, every frond extended, and seeming to give out sparkles of oxygen. Rather than run the risk of losing these pretty green and red weeds so essential to our aquarium—

> Coral and sea-fan and tangle, the blooms and the
> palms of the ocean,—

we gently raise the stones on which they grow, or, with a hammer and chisel, chip off some bits of covered rock, and at once carry them to our glass vase or tank, basin or foot-bath, and settle them in a bed of shore-sand with some shells and bits of rock. Take care that there be as little as possible on your bits of rock beside the weed itself. Scrape off any small adherent sponges, and see that [illegible] have made their tube-homes among the weed-stems; if they have, drag them out, for they will assuredly die, and as surely poison the water with sulphuretted hydrogen, blackness, and evil smells.

In a few days, when the water is clear and you feel sure of your vegetation, begin to make choice of your tenants. In the crannies of the rocks you will find sea-anemones (*Actiniæ*); and a dozen of these are sufficient to turn your glass vessel into a most brilliant living flower-garden. Hanging upon the under ledges of rocks, they look like mere lumps of jelly, but of divers colors. Take them from their piece of rock if you can without injuring them, by slipping your finger under them, or any blunt instrument; if this fail to remove them, try, if possible, to knock away the bit of stone to which they are attached, and so carry them off bodily in your basket of wet sea-weed. When you get them home, put them into a dishful of fresh sea water, and leave them for the night. Next morning, what a change! The dull lumps of jelly have taken root and flowered during the night, and your dish is a garden full of the most beautiful and delicate-colored sea-chrysanthemums, crimson, pink, purple and orange. Touch one and it shrinks away, showing nothing but a row of blue turquoise-like beads around its top or mouth, at the root of the petal-like tentacles it has withdrawn.' This is *Mesembryanthemum*, the commonest of all the sea-anemones, and to be found on most of our coasts. Others there are more gorgeous than he—some like quilled dahlias of all shades of color. *Crassicornis* is a large, variously colored anemone; and these two are sufficient to give much variety and interest to the aquarium; but the more delicate and rarer varieties will repay for a search; the beautiful *Anthea*, with its long hanging languid-looking filaments, which it never wholly retracts within its body; the *Bellis*, or Sea-daisy, common on the south coast of England; and the lovely rose and white *Dianthus*, which is often brought up in the dredge adhering to oyster shells or bits of rock. On the whole, however, (unless an aquarium be specially set apart for the purpose), we believe it is best not to introduce creatures that live in the deep sea, but rather to confine the collection to such as inhabit the shore between the tide marks. When your anemones have lived in their probationary dish for a day or two, carefully transfer the most healthy-looking to your aquarium, settling them as well as you can on a stone or bit of rock by means of your wooden forceps or a bit of stick. We once kept a common crimson-bodied anemone, with a row of wonderful bright blue spots like 'celestial eyes,' for several years, and had the satisfaction of seeing it bud and throw off innumerable tiny anemones during that time; none of which, however, lived to attain maturity.

A few tiny star fishes are pretty in an aquarium; not the coarse, five-fingered fellows with yellow bodies, but the beautiful little rose-colored *Asterias*, which may be found in rock pools for the seeking. Then you want a scavenger in the shape of a tiny crab, who will gently run about and eat up all decaying bits of food, and hide himself under the rocks when satisfied. Do not trust to a hermit crab; he is too fussy and restless for an aquarium, and tears up the plants and scuffles about to the discomfort of the other inhabitants. He is very amusing, indeed, when not expected to submit to the rules of civilized aquarium-life. Put him into a basin of water with another of his kind, having gently taken both out of their appropriated shells, and leave one shell in the water for them to quarrel for. It is the funniest sight in the world to watch their manœuvres and stratagems to secure the shell—the way in which first one and then the other will insert his naked tail into the coveted shell, as if ashamed of being discovered in undress, is not to be forgotten. But this amusement cannot be carried on in a respectable aquarium. [illegible] introduce only a decent little shore crab with a dingy russet coat, very flat, and able to fold himself up into a compact little object at any moment, and lie still and unobserved in any crack or cranny of the colony. Snails are as essential in a marine as in a fresh water tank, and there are many varieties with pretty shells which will do the work you want them for, skillfully and surely. The green film which gathers on the sides of your glass, can, as we have already shown, be removed by rubbing it yourself; but it is best to set three or four live shells to do it for you, 'to keep your subaqueous lawn closely mown.' A few shrimps or prawns, with their transparent bodies and swift, active movements, are desirable to secure; only keep your eye on them, for they have a way of retiring under stones to die without giving any signs of their intention, and then giving off bad gases and poisoning the water.

Of all things, beware of over-stocking a marine aquarium. It bears that process less readily than does fresh water, and is more difficult to renew. Heat and dust are the great difficulties to contend with. If once the water should become hot by exposure to the sun, it is all over with your pets. Yet they must have light, for without it the weeds would not grow; so the only thing to be done is to have a sort of shade or curtain which can be regulated according to the light and heat of your situation. Be careful to use the syringe daily, so as to pump oxygen into the water, and prevent any dust from gathering at the top.

We know how much pleasure such a collection as we have described is capable of giving at the sea-side; how it adds to the interest of the sea-shore rambles, and beguiles many a wet day in-doors. We also know the difficulty of moving the collection up to town; but it can be done by means of separate jars, and cans, and bottles of sea water, and soon re-established in the midst of the murkiest atmosphere. Moreover, all that we have described—weeds, water and animals—can be purchased and established in an aquarium by those who never go to the coast at all. We have seen in a large shop expressly for the sale of 'aquarium stores,' curiosities and treasures unknown to our coasts, which live and thrive well, we are told, in many private aquaria, where temperature is carefully observed and great care given to all arrangements. For the fresh water aquarium we saw many colored spotted water-newts—salamanders they are called—whose native climate is a warm one, and who shed their skins curiously during the year, and cast off their four and five fingered gloves perfect as a model. Then for salt water, we saw a vase full of pretty little Sea-horses (*Hippocampi*), with horses' heads and curly tails; corallines of brilliant hue; serpulæ of bright rose color; and other zoophytes innumerable. But these exotic treasures are only for those who can afford them, and probably do not yield so much real pleasure to the possessors as can be gained from the associations which naturally arise when we recognize the old friends of our childhood in the 'sea's abundant progeny,' and recall the scenes and days when first we learned that a visit to the sea-side does not lose its interest when it is over, but may be prolonged through winter frosts and snows, and in the midst of city bricks and mortar.—*P. L., in Chambers' Journal.*

Fish Culturists at the Aquarium.

The sixth annual meeting of the American Fish Culturists' Association, was held in the Library of the Aquarium on the 14th and 15th of February. In many respects this meeting was one of the most interesting and significant of any of the annual conventions. The association was presided over by Hon. Robert B. Roosevelt and that gentleman in his opening address gave to the members and the pr[illegible] succinct history of the progress and present status of fish culture.

Among the many distinguished gentlemen present were: Prof. Spencer F. Baird of Washington, Secretary of the Smithsonian Institution and United States Fish Commissioner; Prof. J. W. Milner of the Smithsonian Institution; Mr. Samuel Wilmot of the Fish Commission of Canada; Mr. William M. Hudson of the Fish Commission of Connecticut; Mr. T. B. Ferguson of the Fish Commission of Maryland; Mr. M. Walheim of the Fish Commission of Norway; Mr. Livingston Stone of California; Mr. Seth Green, Superintendent of the New York State Hatching-house; Mr. Charles B. Evarts of Vermont; Mr. B. B. Porter of New Jersey; Mr. C. J. Battemanne, Superintendent of the Fisheries in Holland; Mr. Charles Hallock; Mr. W. M. Tileston and Mr. J. J. Van Wyck of New York; Mr. B. B. Phillips of Brooklyn; Mr. F. Mather of New York, and Mr. M. C. Edmunds, Secretary, and E. G. Blackford, Treasurer of the Association. The interest manifested by the members in the Aquarium and especially in the fish-hatching department, was marked and gratifying, and the efforts put forth by Mr. Coup to promote their comfort and convenience were gratefully appreciated. For a full report of the proceedings, including the valuable papers read, we refer to the official organs and reports of the society.

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The attention of the visitors to the Aquarium is specially directed to the collection of mammoth alligators, now occupying the whale tank and to the bottle-nose seal, which is a close captive in the open tank to the right of deep sea tank No. 36.

A COMPLETE INDEX OF ALL THE FISH IN THE TANKS

The following tabulated list is designed, with the assistsnce of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER TABLE TANKS.

Tank 1.—Anemones.

Tank 2.—Porgies, Pectens.

Tank 3.—Striped Gurnards, Algae, Toad Fish, Smooth-browed Bull Head, Winter Flounder, Tautog.

Tank 4.—Sea Raven, Spider Crabs, Rock Crabs, Pectens, Algae, Sea Urchins.

Tank 5.—Hermit Crabs, Spider Crab, Pectens, Lebias, Algae, Cunner, Sea Urchins.

Tank 6.—Star-fish, four varieties, Hermit Crabs, Pectens, Algae, Barnacles, Anemones, Cunner.

Tank 7,—Serpula, Living Sponges, Aromias, Bryozoas.

Tank 8.—Anemones, four varieties, Algae, Living Corals.

Tank 9.—Crabs, 7 varieties, Algae.

Tank 10.—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Algae, Young of Edible Crabs,

Tank 11.—Lafayettes, Algae, Little Hermits, Pear Snails.

Tank 12.—Sea Horse, Sheepshead, Lebias, Algae, Serpula, Periwinkle Spawn, Skates' Eggs.

FRESH WATER TABLE TANKS.

Tank 13.—Brook Pickerel.

Tank 14.—N. Y. Shiner.

Tank 15.—Young Brook Trout.

Tank 16.—Yellow Perch.

Tank 17.—Banded Proteus.

Tank 18.—Young California Salmon, hatched in the Aquarium Dec. 4, 1876.

Tank 19.—White Perch.

Tank 20.—English Roach presented by Captan Mortimer, Black-nosed Dace.

Tank 21.—Long eared Pond fish, Lamphrey.

Tank 22.—Hell Benders.

Tank 23.—Common Sun fish.

Tank 24.—Black Bass.

Tank 25—Pickerel.

Tank 26.—Brown Cat fish.

Tank 27.—Young Salmon.

POST TANKS.

Tank 28.—Sticklebacks.

Tank 29.—Young Cat Fish, Lobster, etc.

Tank 30.—Dace.

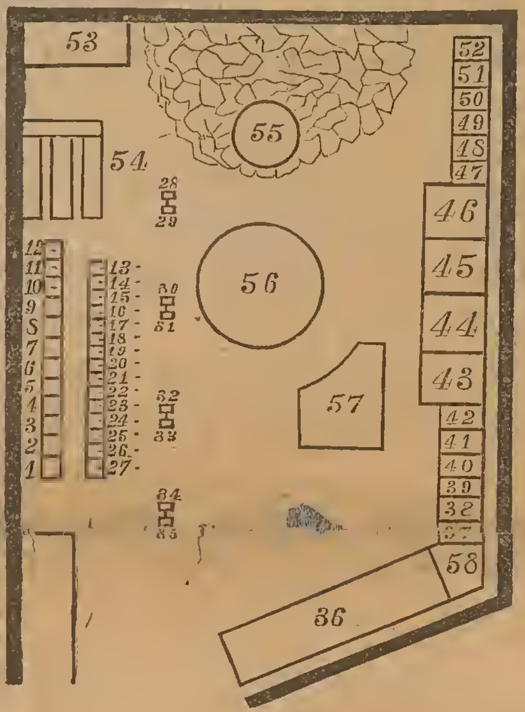
Tank 31.—Algae, Unio, Munnon.

Tank 32.—Fresh water Lobster, Dace.

Tank 33.—Crimson Spotted Triton.

Tank 34.—Black Headed Dace.

Tank 35.—Young Salt Water Actinae, Coral, Algae.



Ground Plan of the New York Aquarium.

SALT WATER SERIES.

Tank 36.—Sharp-nosed Sturgeon, Blunt-nosed Sturgeon, Spotted Skate, Summer Skate, Spotted Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog, Ling.

Tank 37.—Striped Bass, Codlings Flounders.

Tank 38.—Five varieties of Star Fish.

Tank 39.—Lobsters

FRESH WATER SERIES.

Tank 40.—California Salmon, Lake Trout, Brook Trout.

Tank 41.— Yellow Perch, Brook Pickerel, Blue Cat-fish, Long-eared Pond fish, common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass, White Suckers, Wall-eyed Pike, Spotted Perch.

Tank 42.—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank 43.—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Long finned Chub Sucker, Wall-eyed Pike, Lake Pickerel, Black Bass, White Fish, Rock Sturgeon.

SALT WATER SERIES.

Tank 44.—Shoal of Striped Bass, Black fish, Sea Perch, Blue fish.

Tank 45.—Deep Sea Cod.

Tank 46.—Blackfish, Striped Bass, Lafayette, King Crab, Skates.

Tank 47.—Flounder, Tomcod, Toad Fish.

Tank 48.—Lobster, Lady-crab, Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank 46.—Spotted Cod Lings.

Tank 50.—Rock Cod.

Tank 51.—Black Sea Bass.

Tank 52.—Lobster, Striped Bass, Porgies, Lafayette Fish.

Tank 53.—Brook Trout, Salmon Trout, California Salmon, Kenebec or Atlantic Salmon.

Tank 54.—Fish hatching troughs.

Tank 55.—Sea Lion.

Tank 56.—Alligators,

Tank 57.—Seals.

Tanks not numbered contain the Salamanders, Japanese Turtle, Otters, Bladder-nosed Seal, &c. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions.

THREE SONNETS.

MARCH.

Month which the warring ancients strangely styled
The month of war—as if in their fierce ways
Were any month of peace !—in thy rough days,
I find no war in nature, though the wild
Winds clash and clang, and broken boughs are piled
At feet of writhing trees. The violets raise
Their heads without affright, or look of maze,
And sleep through all the din, as sleeps a child.
And he who watches well, will well discern
Sweet expectation in each living thing.
Like pregnant mother, the sweet earth doth yearn ;
In secret joy makes ready for the spring ;
And hidden, sacred, in her breast doth bear
Annunciation lilies for the year.

H. H.

—*March Scribner.*

NATURE.

As a fond mother, when the day is o'er,
Leads by the hand her little child to bed,
Half willing, half reluctant to be led,
And leave his broken playthings on the floor,
Still gazing at them through the open door,
Nor wholly reassured and comforted
By promises of others in their stead,
Which, though more splendid, may not please him more ;
So Nature deals with us, and takes away
Our playthings one by one, and by the hand
Leads us to rest so gently, that we go
Scarce knowing if we wish to go or stay,
Being too full of sleep to understand
How far the unknown transcends the what we know.

H. W. LONGFELLOW. —*March Atlantic.*

SLEEP.

When to soft Sleep we give ourselves away,
And in a dream as in a fairy bark
Drift on and on through the enchanted dark
To purple daybreak—little thought we pay
To that sweet bitter world we know by day.
We are clean quit of it, as is a lark
So high in heaven no human eye may mark
The thin swift pinion cleaving through the gray.
Till we awake ill fate can do no ill,
The resting heart shall not take up again
The heavy load that yet must make it bleed ;
For this brief space the loud world's voice is still,
No faintest echo of it brings us pain.
How will it be when we shall sleep indeed?

T. B. ALDRICH.

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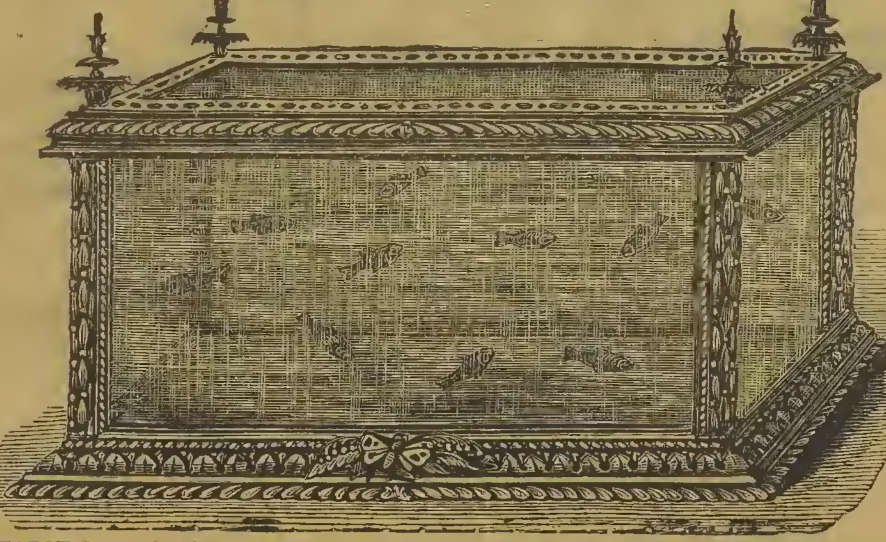

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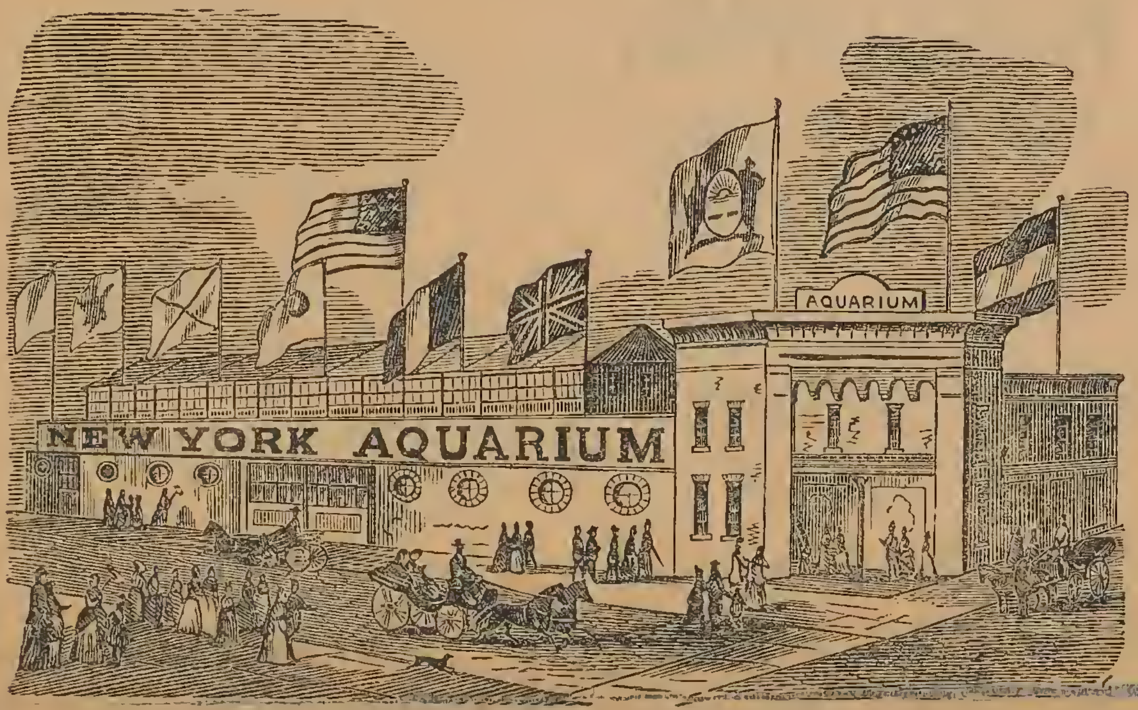

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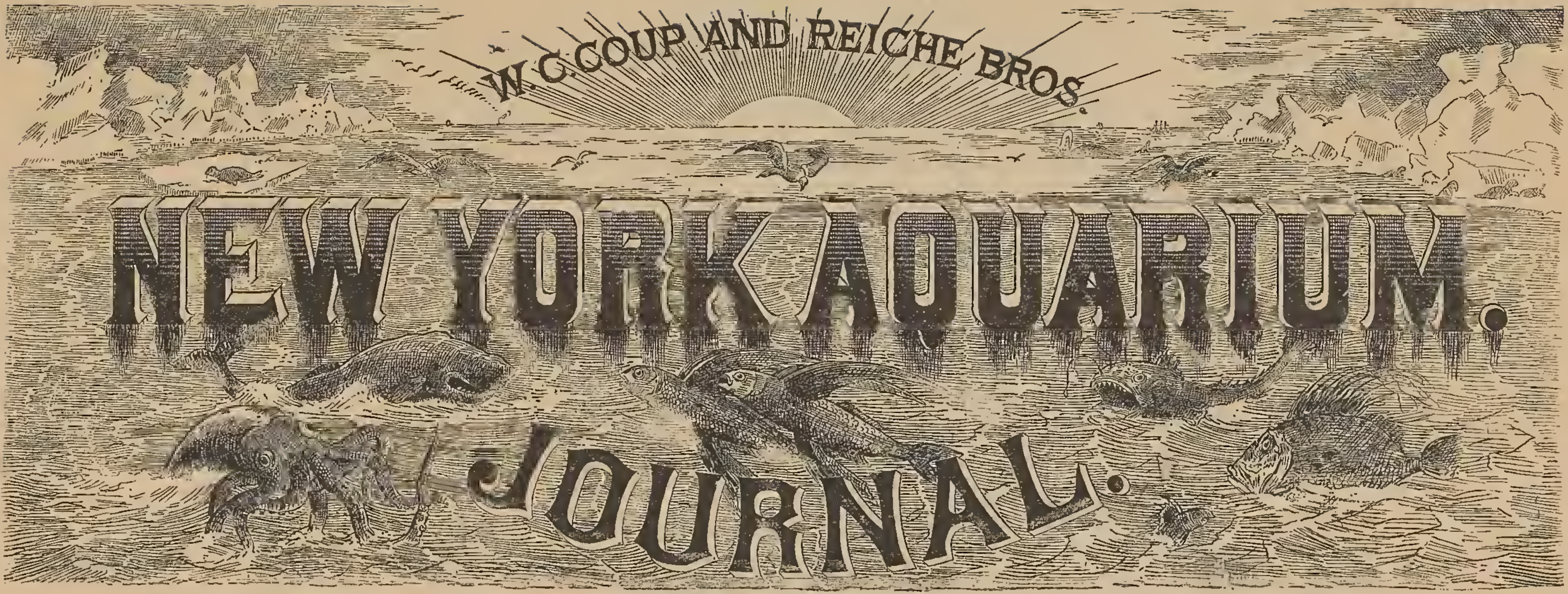

W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM. JOURNAL.

Published Monthly at the New York Aquarium, cor. 35th Street and Broadway.

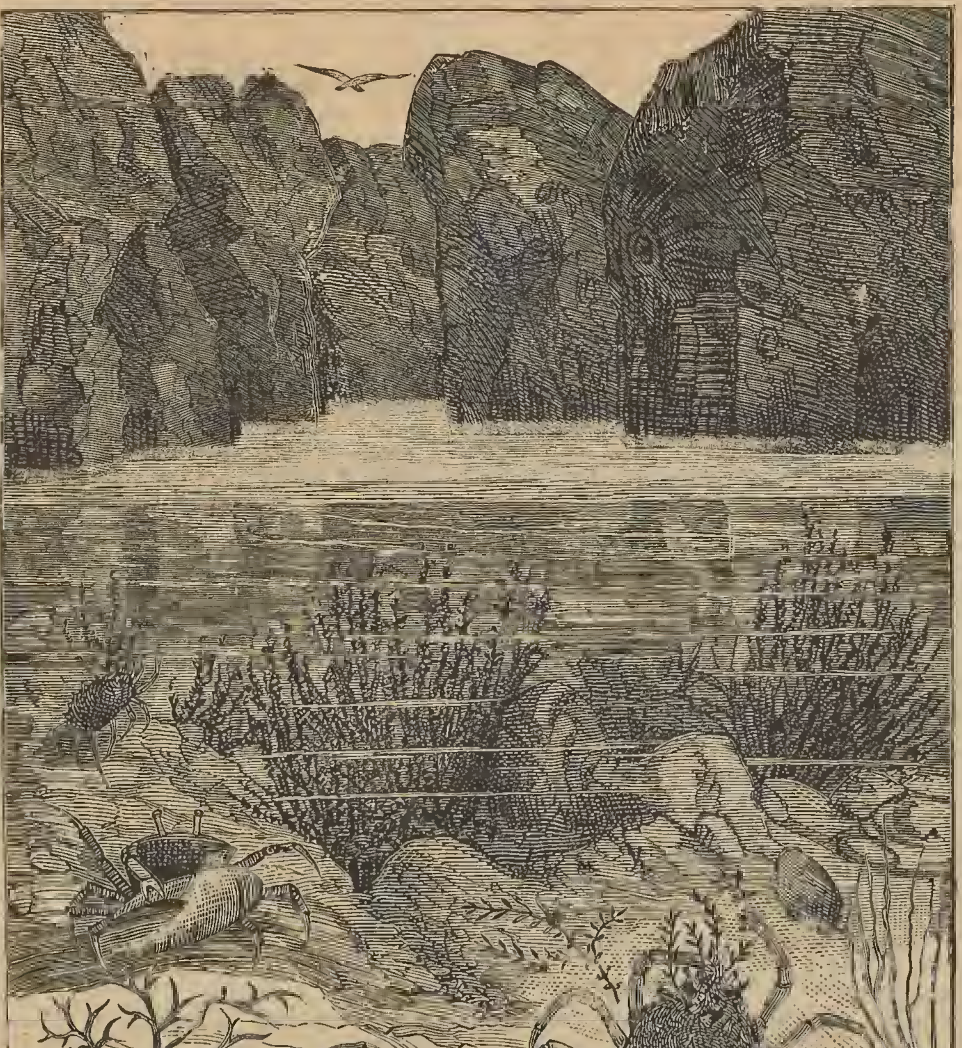
VOL. 1. NEW YORK, APRIL, 1877. NO 9.

THE SPIDER CRAB.

Society and occupation in the world of the sea are represented by masons, builders, marauders, usurpers and plunderers, and each have their distinguishing peculiarities. A fancy of the quaint spider crab is to decorate himself with algæ and sponges, and none but the most brilliant in color seem to fascinate him. He moves about "slowly and solemn," and is deliberate in decision and determined in purpose; his hard, spiny shell, of sombre color, adds to the dignity of his appearance, and the methodical way in which he uses his claws and carries himself about really impresses one with the idea that he is quite an important personage in the Aquarium When wishing to array himself he finds a brilliant alga or sponge, and pinches off piece after piece with his long slender claw; these when broken are dipped in the glutinous fluid which the mouth contains and carried to the back and fastened securely. Sometimes, after he has attached a particular fragment, he reaches back his claw the second time, making careful examination, apparently to satisfy himself that it is secure.

This fancy is indulged in only when the crabs are young, and is done in the fall, when ready for the winter, to obscure them from hungry skates and sturgeon. Sometimes, in a tank of many animals, the crabs seem to imagine themselves among enemies, and often cover their shells. Fully grown crabs are too large and too hard to be swallowed and are seldom seen fastening sea-weeds to their shells. Their joints are very stiff and claws slow of motion at the best, and when they are old the carrying of the sprays to their backs and fastening them seems a laborious task.

There is an old mill-race on Long Island where many of these crabs have been carried among sponge-covered rocks whence they cannot return. Dainty bits of red and yellow sponge have been attached to their shells which have grown so as to nearly cover them; whe [illegible] motion the crabs look like moving sponges.


THE SPIDER CRAB.

Although much preferring the brilliant algæ and sponges, the spider crab will sometimes make use of other material. Not long ago a tank was cleaned at the Aquarium and a spider crab was confined in one corner by a barricade of stones. A gentleman threw in sprays of Sertularia and bits of the bases of anemones from which the parents had torn themselves and these were seized by the crab and attached to his shell.

The spiders cast their shells like the rest of crab-dom, but unlike other varieties have no attendant to protect them while their shell is soft. Two that were nearly ready to "shed" in the Aquarium suddenly broke from their shells when the tank received a sudden jar. They are less pugnacious than the hermit and other crabs, appearing to quarrel only over their food. They have keen appetites and good noses for scenting food. Mr. R. states that he often made a commotion among them at the Aquarium by holding a dead minnow in his partly closed hand in the water. They will scramble up and down his arm, and when reaching the hand often have a contest for the dainty morsel. More curious than this, I think, is the story of one of them who deliberately took a seat on one of the beautiful anemones and with his claw pulled out a shrimp that the anemone had taken into its stomach.

Another freak of one of these at the Aquarium was to attack a scallop in open shell. The scallop closed suddenly together and held the crab captive for several hours. He at last gained release by snapping off his own leg. We can scarcely call this a catastrophe, however, as nature kindly reproduces their members. Some varieties of the spider crab grow to great dimensions. The Rev. Samuel Lockwood says there is a specimen of the long-armed spider-crab of Japan in the cabinet of Rutgers College, New Jersey, which measured, with limbs extended, eleven feet six inches. He says also that it is the largest specimen known.

Every little creature in the sea is dependent on some of the others for life and health, and the spider crab, in eating all decaying matter, purifies the water for the rest. How wonderfully strange are the organizations of marine life. Each animal has independent qualities that distinguish it from the rest, and all have reciprocal harmonies that link them together in one great chain. Ida B. Roberts.

* * *

OUR YOUNG SKATE.

A reference to the index on the last page of the Journal will indicate that already has the Aquarium become, in a single instance, self-supporting; that is, the occupants of several of the fresh-water tanks are natives of the Aquarium. Already have these young salmon grown so in size and appetite that larger quarters and still more liberal rations must be allowed them. Although the successful propagation of these salmon is a cause for special congratulation, yet a second birth has recently taken place here which is of exceptional interest to science. We refer to the young skate recently hatched. The egg from which this odd creature was hatched was discovered by Capt. Quigley during one of his submarine explorations in tank 36. It, with several others, was carefully removed to one of the smaller tanks, and as the result of careful and judicious treatment the processes of incubation went rapidly forward, until at last the youngster makes its appearance attached to the sac from which it is to draw its life for many days.

This little creature, it will be observed, does not resemble in form its parent, but on the other hand possesses more of the marked characteristics of the race. Instead of being flat and floundering it is slim and active, presenting the appearance of a small white snake. The naturalist will recognize this acquisition to the list as one of extreme interest and value. Placed as it is in a position where every change in form and development may be carefully watched and studied, the little stranger will, it is hoped, survive the early stages, and eventually become as grotesque a member of the Aquarium company as its ungainly parent.

We must here, however, anticipate possible misfortune, by stating that should the little fellow die before we go to press we will still retain this announcement as marking an interesting event in the history of the Aquarium.

CURIOUS PARASITIC FORMS AT THE AQUARIUM.

In passing in review the beautifully inhabited tanks of the Aquarium the attention of the visitor is mainly taken up by the larger forms that pass to and fro, appealing directly to the eye; and many of the smaller creations, that have as important a work to do, thus escape scrutiny. Some of these creations are mere mites in the great sea, but in the plan of nature they play the important part of safety valves and gaugers to their larger fellows. We refer to the parasitic animals that are found in multitudinous form and shape in every tank.

If we watch the shark or dog-fish that now swims gracefully past in the large tank we see delicate thread-like streamers upon his various parts, two in number to each animal, and blood red in color, that at times give his sharkship a decided holiday appearance. But it is a serious affair for the victim, as these minute flags are voracious blood-suckers that burrow in the thick hide and render his life *not* all that it is painted. A fine cod rushes past us; no visions of being "*salted for the trade*" cloud his fishy mind, and all seems serene; but could we look, "not into his inmost soul," but mouth, we would find a despoiler of happiness belonging to the *Isopoda*. It deserves more than a passing notice, and having secured the fish we remove him to the dissecting rooms and place the parasite under the glass. We see a small pair of gills of rounded membraneous make up, placed at the extremity of six pairs of members attached to the abdominal segments; we will call them false feet. The exact number of feet are seven pairs, and are armed with long sharp prehensile claws, admirably adapted for the work they have to do.

The specimen before us is a female, and wonderfully like the marsupial animals, as directly beneath the thorax, and attached to the base of the feet, is a miniature pouch wherein are seen the tiny eggs. Here they are held, as are the young of the kangaroo, until complete in form, when they are expelled by their atomic parent, and hasten to fasten upon some unfortunate fish and suck its life away.

Another look into the mouth of the cod shows a disc shape, crab-like creature, known out of the water as Caligus pescinus. They often grow to extreme size, and have been found completely obstructing the mouth of large cod, and considerable force has to be exerted in removing the sharp claw. In one tank we find a shad whose mouth has been converted into a lodging house for this parasite. It has taken up its stand on the tongue of its host, and, like the old man of the sea, divides with him as regards the provisioning. In the corner of the tank a large blackfish stands on end, while under his pectoral fin a little monster, with a busy head and horny tail, is slowly digging away and sapping the living lode. If we examine this little parasite closely we find that there is truth in the lines,—

> "Big fleas and little fleas
> Have lesser fleas to bite 'em;
> The lesser fleas have smaller fleas,
> And so on *ad infinitum*."

for, closely packed away around the tender parts of this pest, we find a "lesser flea," known to the scientific as the *Cineras vitatta*, and packed upon one another we could find them until the eye failed to distinguish them from the atom. If now we were to become still more curious, and penetrate the liver of this patient sufferer, we would find it infested with hordes of little creatures known as the "cysticerci." In the stomach, claiming their share of soft clams, we see the minute members of the genus Nebalia. They have a quaint, curass-like shield for protection from some lesser flea, and terminate in a long tail, set off in a fierce and warlike manner by two sharp-pointed bristles.

Side by side, and claiming equal rights, we find a beautiful little parasite that has never been found out of the fish. It is almost three inches long, and decorated with a long delicately variegated red and white attenæ, and forms one of the most striking forms in parasitic life. Thus we see that the sedate blackfish is no more or less than a "tenement on fins," and forced to provide lodging and board for hundreds of creatures who, if the larder runs dry, do not hesitate to make a meal of their patient living habitation. In a late number of the *Journal* some lines appeared explaining the wail of the whale. He also wails for the removal of a large crustacean, with the still larger name of *Laemodipod.* that clings to his back feasting upon his rich blood in a right royal manner. They have no special point of attack, but cover the whale on any available point, and at some times of the year in the open sea so changes its color that the mass of parasites can be seen at a great distance. In appearance they are long and thin and resemble a number of hooks hanging from a stick; the first claw is prehensile and attached to the head, and the other legs are also armed with long hooks The graceful Gar-fish and Pike are not neglected by these creatures, and from tank to tank the student can find hundreds of strange forms preying upon one another in the great fight for existence. Even the beautiful Sea Anemone has its sorrow, and strange to relate one variety of this animal affords shelter in its unorganized stomach to a fish; a bond of sympathy exists between them, as the fish never appears digested and the tentacles that are deadly to other forms close the mouth of its retreat as if to protect it from all harm.

Hundreds of other forms could be mentioned to show the wonderful workings of the laws of nature—that eliminate in exact proportion as they allow production. But the above few examples will serve to show that life "down among the Mermaids" has its drawbacks.

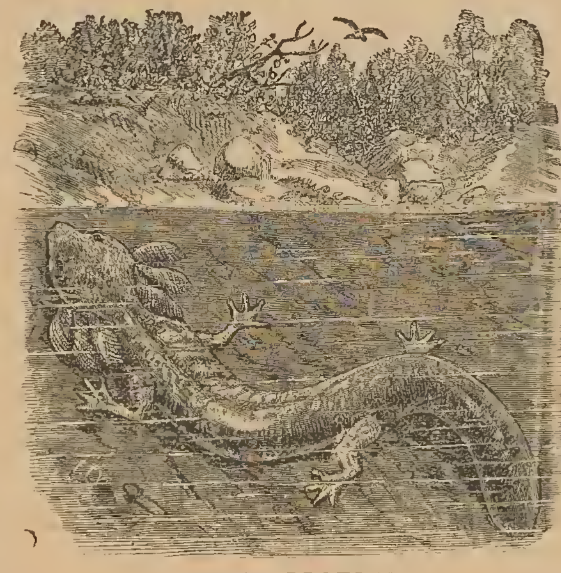
C. F. Holder.

* * *

Many of our readers will doubtless be looking for a good Boarding School this Spring, within easy access of the city. Park Avenue Institute at Bridgeport, Conn., is a very good Private School for Boys, with high testimonials from some of our friends. The number is limited and the accommodations superior. The Principal, Mr. L. B. Jones, has considerable faculty of making boys think for themselves. A good feature of this School is Lectures. weekly, on Natural History.

THE PROTEUS AND AXOLOTL.

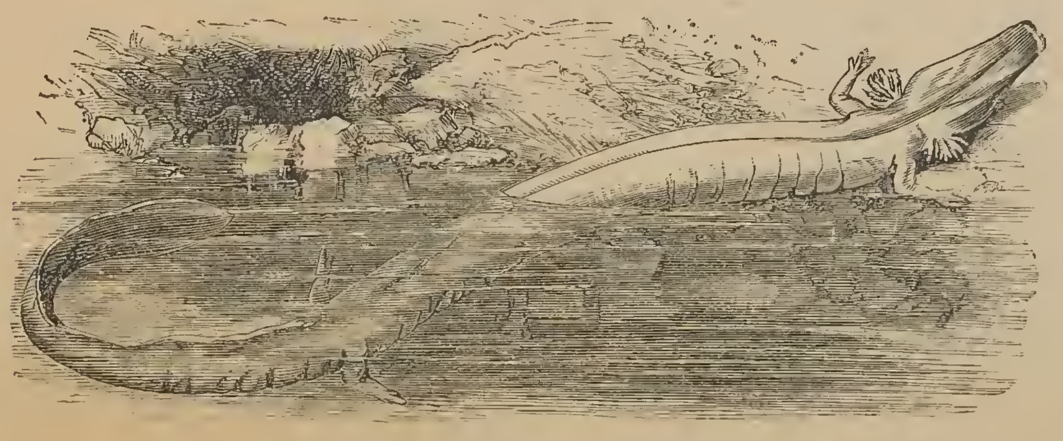
Among the recent additions to the Aquarium which should engage the attention of the visitor, are the two specimens of the white Proteus (*Proteus anguinus*). These strange creatures were first discovered by Baron de Zois in a subterranean lake in the duchy of Carniola, at Adelsberg, Austria. From this region the specimens now shown in tank 16 were obtained, and their presence is a renewed evidence of the zeal displayed by the manager in his efforts to procure rare wonders for the Aquarium. The Banded Proteus, which has long been an inhabitant of tank 17 is an old acquaintance. It will be well, however, to direct attention to the peculiar form of the gills, there being three on each side, ramified and fringed, and of a red color, on account of the blood which circulates through them. Dr. Beall invented an ingenious arrangement by which this phenomenon of circulation could be witnessed. The blood discs are of so extraordinary a size that they can be distinguished by an ordinary pocket magnifier while passing through the vessels.



BANDED PROTEUS.

The Banded Proteus is found in Lake Champlain and at the outlet of Lake George. It is also to be found in certain of our Northern and inland lakes, where its presence is a bane to the fishermen, since it has a peculiar fondness for the spawns of the white fish. Its movements in the water are usually slow, but, from the size of its tail, it is evident that when occasion demands it can move with great speed. They are said occasionally to come upon the land. Its color is brownish with blackish spots, and its length varies from one to two feet.

The white Proteus may be regarded with more interest, owing to its rarity and also to the peculiarity of its habitat and the consequent modifications of structure. Like the fish in the mammoth cave these creatures, having no need of eyes, these organs are not fully developed. The color also is white, a condition doubtless due to the nature of their dwelling place. Like the Banded Proteus they have the external gill structure, and it is this peculiarity which has gained for it the special attention of the student.



BLIND PROTEUS.

Wood, writing of the *proteus anguinus*, states that at the duchy of Carniola is a most wonderful cavern, called the grotto of the Maddalina extending many hundred feet below the surface of the earth, and consequently buried in the profoundest darkness. In this cavern exists a little lake, roofed with stalactites surrounded with masses of rock and floored with a bed of soft mud, upon which the Proteus may be seen crawling uneasily, as if endeavoring to avoid the unwelcome light by which its presence is known. These creatures are not always to be found in the lake, though after heavy rains they are tolerably abundant.

The same writer adds that the discovery of this animal is extremely valuable, not only as an aid to the science of comparative anatomy, but as affording another instance of the strange and wondrous forms of animal life which still survive in hidden and unvisited nooks of the earth. For several of the specimens of Banded Proteus now on exhibition our acknowledgements are due to Prof. Birt G. Wilder of Cornell University.

In the present connection reference may be made to the Axolotles in tank 20, these also are new arrivals from Mexico. An examination will at once disclose an ultimate resemblance to the Proteus which appears both in the lizard-like form and in the gill structure. In Mexico, these creatures are esteemed highly for food and it is said that the army of Cortez once subsisted entirely on Axolotles obtained from a lake near the City of Mexico. We have the personal testimony of an army surgeon now stationed near the southwestern border, that the Axolotl is a dainty dish, though as has been so often said of the oyster, it was either a very brave or a very hungry man, who ventured to eat the first one. Though not thriving well in confinement, yet the Axolotl has been known to breed under artificial conditions.

SEA HORSES.

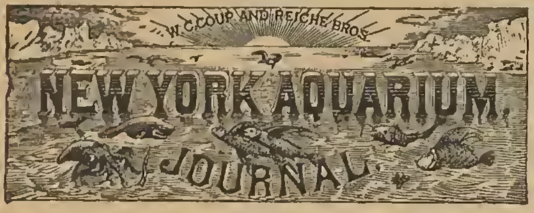
To visitors to the great aquaria which are now springing up in every part of the country, the Sea-horses will be familiar. Their hardy nature together with their curious appearance have marked them out as aquarium favorites; and they may fairly, in respect of their zoological fame, divide the honors with any of their companion-tenants. Imagine a little body from four to six inches in length, topped by a head which in outline exactly resembles that of a horse, and tapering off below or behind into a lithe, flexible, and pointed tail, and we may form a rough idea of the general appearance of one of the Sea-horses. A pair of large brilliant eyes, each of which may be moved independently of the other; whilst to the body itself, may be attached long streamers of sea-weed, serving to conceal the little beings as they nestle amid their marine bowers, each looking like some veritable creation mythological.

They are intelligent lively little creatures, learning in time to know the hand that feeds them. Fixed by their tails, they may be seen actively to dart the head at any passing object adapted for food. Whilst, when they wish to free their bodies from the attached position, they appear to manoeuvre with the chin and head in order to effect their purpose. Their food appears to consist of small crustaceans, worms, and others of their marine neighbors, and they are known to be especially fond of such delicate tit-bits as are afforded by the eggs of other fishes.

Perhaps the most curious part of the history of the Sea-horses relates to their care of the young. Fishes generally take little or no care of their offspring, and it is therefore the more surprising to encounter in the little beings before us, a singular example of parental fidelity and attachment. Nor, as might be expected, is it the mother-fish who is charged with the task of attending the young. Contrary to the general rule, the male fish assumes the part of nurse, and well and faithfully does he appear to discharge his duties. At the root of the tail in the male Sea-horses, a curious little pouch is seen. In this pouch the eggs laid by the females—which do not possess a pouch—are deposited, and are therein duly hatched. Nor does the parental duty end here; for after the young are hatched and swim about by themselves, they seek refuge in the pouch during the early or infantile period of their life whenever danger threatens them. This procedure forcibly reminds one of the analogous habits of the kangaroos and their young; but the occurrence is the more remarkable in the lower and presumably less intelligent fish.

Some experiments made on Sea-horses seem to demonstrate the existence of a more than ordinary degree of attachment to their young. Thus when a parent-fish was taken out of the water, the young escaped from the pouch; but on the parent being held over the side of the boat, the young at once swam towards him, and re-entered the pouch without hesitation. Some authorities have not hesitated to express an opinion that the young are nourished within the pocket by some fluid or secretion from the pouch itself. But further observation is certainly necessary before this latter opinion can be relied upon.

[*Chambers' Journal.*


W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL.

W. S. WARD, Editor.

NEW YORK, APRIL, 1877.

The New York Aquarium Journal *will be published monthly at the Aquarium, corner of 35th Street and Broadway, New York City.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense of mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

The many parents and teachers whose presence at the Aquarium with their children and pupils is an evidence of the high esteem with which they regard it, will not have failed to discover that the institution is accomplishing an important service as a popular educational agent. Were further proof of this desired we need but refer to the children's page of the Journal. Already has Uncle Octopus become a recognized character in the list of our young friends' acquaintances, and the compositions on whales and seals which have appeared in former numbers prove plainly enough that the little ones have their interest already engaged, and require but the opportunity and a gentle prompting to make rapid advances into the rare and beautiful realms of nature. It has been the repeated testimony of those who visit the Aquarium, even though they be advanced in years and acknowledged attainments, that owing to the lack of just such an opportunity as is here afforded them they have until now lived in ignorance of the wonderful world of the sea. If, then, the Aquarium affords such valuable opportunities for increased knowledge to those who are already learned, what must be its additional value to the child who adds to the pleasure of all newly acquired knowledge the youthful fancy which clothes every new discovery with wonder and beauty.

It would not aid our purpose, nor is it in accord with our own convictions, to decry book learning, that we might exalt the claims of nature as a teacher; and yet it goes without the saying that a child will be the better able to accept the testimony of those who have explored further, if he himself has even skirted the borders of the mystical land of which he reads.

In thus making a plea for the children, candor should compel our readers to believe that their presence at the Aquarium is the occasion of a satisfaction which is independent of any desire, however worthy, to secure its financial prosperity. As it is nothing against our great educational institutions that a price is set on the privileges there offered, so the manager of the Aquarium claims from the teachers and parents an honest confidence in his desire to improve the minds as well as enhance the pleasure of the little ones.

RECENT ADDITIONS.

The visitors to the Aquarium, whose acquaintance with the subject is such as to render them specially observing, will have discovered in several of the smaller tanks objects of peculiar interest; among these we direct attention to several of the more rare and curious specimens of marine life recently added. The last, and on many accounts the most interesting additions, are the

BLIND FISH FROM THE MAMMOTH CAVE.

Every American child has been taught to regard the famous Mammoth Cave of Kentucky as one of the seven of our natural wonders. Crossing this cavern is a deep and silent river, having its source no one knows where, and flowing none can tell whither. Enveloped in the gloom of an everlasting night the very ripple of its waters suggest a mystery. The first venturesome fisherman or naturalist who dared to trespass on this domoin was rewarded by so marvelous a "catch" that the fish secured have since been regarded as among the most interesting of natural wonders. Like the Proteus described elsewhere, and which also has its home in a cave-lake, these fish are white and blind. The Craw-fish, from the same cave, of which several specimens are now on exhibition, are also white and eyeless. At an early day we shall give more extended attention to these fish, since their peculiarities of structure are such as to merit it. At present it may be stated that the absence of eyes is due to the simple fact that, living in the dark, eyes would be of no service, and so are eliminated.

On the table near the globes containing the blind fish and craw-fish may be seen three

SALAMANDERS.

These creatures were presented to the Aquarium by Capt. Mortimer, whose services as a collector and student have so long been recognized and esteemed that it is with special pleasure we have been permitted to place his name in the list of contributors to the Aquarium. The Salamander has been the theme of many a natural history romance, and in the early days of tradition and fable they were believed to be endowed with various marvelous attributes. That they could resist the fire was so firmly believed that to this day the name is a synonym for all that is proof against the forces of the flames. So impressed was Pliny with the truth of this idea that it was not until he had placed one on the fire and seen it burned to a crisp, that he ventured to correct the story. It is, however, claimed that the Salamander does secrete a liquid in certain pores which will protect the surface of the body for a brief period against the action of a moderate flame. It was also long supposed that the bite of this creature was fatal, and moreover that if the flesh be eaten instant death follows. Referring to this belief it is actually recorded in the "Acts of the Academy of Natural Curiosities," as a fact worthy of note, that "a man had survived after having eaten a Salamander which his wife had put in his food in the hopes of becoming a widow." The porous secretion which doubtless does exist, was also believed to be poisonous, and it has been said that the leaves of any shrub over which the creature crawled would at once wither and die. All this and more might be told of this innocent reptile which the writer has handled with impunity, and which lies snugly at home in its moss bed in the fern case allotted to it.

Still another new arrival, and one which will be recognized by its kinship to the Kingiyo, is the

JAPANESE TELESCOPE FISH.

The two fine specimens of these fish were recently brought direct to the Aquarium from Germany, though they hail originally from Japan. Like the Kingiyo they are a species of carp, the name being given to them on account of the peculiar form of the eye. On examination it will be seen that these organs, instead of occupying a cavity, are placed at the extremity of two abnormal protuberances. It is a well-known fact that certain insects are endowed with the same peculiarity, and can simply by the turning backward of these projections see behind them. In addition to this peculiarity of eye structure these fish have alse the "three tails," similar in general form, though less marked, than in the Kingiyo.

A fourth addition, which is less recent and yet which has not received the attention which it deserves, is the

JAPANESE TURTLE.

This little creature differs from others of its kind in that its shell is covered with a rare growth of algae, which, when the creature is swimming, trails out behind like a natural appendage. This turtle often figures in antique bronzes, and takes a high rank in the esteem of those odd people with whom to be grotesque is to be rare and highly prized.

In the department of fish-hatching, although the following warm months may necessitate less active operations with the salmon and trout, yet the services of Mr. Mather will be constantly engaged. Already have the

SKATES' EGGS

become objects of special care and interest, and the successful hatching of one of these proves that the Aquarium is possessed of facilities for this work that are unrivaled. In tank 12 may be seen a number of these odd looking eggs, having the appearance of brown pods, and a critical examination proves that the processes of incubation are rapidly going forward. These eggs were laid in tank 36, from which they were transferred to their present home in order that the temperature and circulation might be more carefully regulated, and also that they might be more accessible and more carefully watched and studied.

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It is with pleasure that the manager of the New York Aquarium takes the liberty of making a public acknowledgment of his obligations to Mr. W. A. Lloyd, whose long experience in the management of kindred establishments renders his advice and counsel of marked assistance in this our first home enterprise.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

My young friends, your Uncle Octopus has been so pleased with the compositions you have written in answer to his request, that he means to have you try again. This time you may find it a little harder work than when you wrote about whales and seals, for that which he wishes you to write about is not so well known. Those who have been to the Aquarium have seen in the small salt-water tanks a number of beautiful white, red and pink objects, which look very much like flowers. They seem to be blossoms of china-asters on the top of very big stems. Sometimes they are wide open and at others they look like round patches of red and yellow jelly spread out on the rock. Now these are not flowers, but living creatures, and they are known by the name of sea-anemones. In the March number of the Journal there was given a long description of these wonderful creatures, and how they lived and moved about. Now, what I want is for you to each try and write, in your own way and with your own words, all you know about them. Of course you will have to read about them first, but you must not write just what others have said, but try and make as good a composition of your own as you can.

In some of the compositions about whales and seals your Uncle Octopus discovered that the one who wrote them was not careful enough to tell what he knew in his own words, and so it would not have been fair to give the prize to any who had written only what was in some book.

Remember, we shall give two prizes for the best two compositions about sea-anemones. Those who write them must not be over twelve years of age. They must be written by themselves, and must be ready before the twenty-second day of April.

We have received, besides the regular compositions, a few very nice and funny letters, which will be published when there is room for them.

Your affectionate Uncle Octopus.

THE STAR FALLS IN LOVE.

BY MADGE ELLIOT.

"I'm in love," said the Star.
"You are?" said the Gar;
"Pray tell us, my friend, all about her."
"She is lovely!" "Of course,"
Laughed the dainty Sea-horse,
"And existence is worthless without her."

"And what is she like?"
Asked the Porgie and Pike.
"In color, the loveliest yellow,
With broad stripes of black
Down her beautiful back,
And her eyes—well, they dazzle a fellow!"

"Why, who can she be?
Did she come from the sea?"
Asked the Lady Crab's prettiest daughter.
"A Gold-fish, I think,"
Said the Skate, with a wink.
"You are wrong—she don't live in the water."

"Let me take a boquet,"
Said the Shiner so gay,
"Of Anemones—daisies or roses."
"Oh! tell us, pray do,"
Said the Blackfish and Blue,
"In what tank this rare beauty reposes."

"Has she been in this place
Very long!" asked the Dace.
"She came just before our commander—
The Prince of Whales—died.
And she *must* be my bride;
My Sarah—my sweet Sal Amander!"

STAR-FISHES.

What will you think of a fellow who has five arms, with an eye in the end of each, several hundred little legs, a mouth in the centre of his body, and who, when he is hungry, gets "outside of his dinner" by turning his stomach out of his mouth and over the morsel to be devoured?

Wouldn't you think, with so many arms, he would be like the wolf in Red Riding-hood—"so much the better to hug you with"—and wouldn't you be sure, with all those legs, he could run like a race horse; and can't you imagine what a meal he might take with so accommodating a stomach.

STAR-FISH.

I am talking about the Star-fish who, with all his arms, is not in the least affectionate, but as selfish and greedy as he can be; and who, with all his legs, gets around in the slowest kind of time. He is sure-footed, however, and gets over all kinds of surfaces and into all kinds of crevices, and it's not a bad thing, you know, to be "slow and sure" in this world.

The funniest thing of all is that if one of his arms is bitten off by a fish or broken against the rocks, another one grows just as good as new. What a convenience; and is it not a pity that we cannot be supplied with new members now and then?

If you have never seen one let me tell you just how he looks. He has the shape of a five-pointed star, and measures from three to six inches from tip to tip. His covering is formed of movable plates, so that he is able to send himself in every direction. The numerous little feet beneath each ray or arm are little tubes — locomotive suckers—which enables them to move securely about. A Star-fish will often cling to a rock so firmly that he will allow his feet to be pulled off rather than loosen his grasp.

A curious spot is seen on his back, near the junction of two arms. It is a sort of minute sieve and forms an entrance to a series of internal water tubes, some of which connect with the sucker feet and supply them with water.

A Star-fish is as fond of raw oysters as you or I, and a right hungry fellow can eat ever so many more. They travel chiefly in schools, though a solitary one is seen occasionally. A number often roll themselves together in a kind of ball and float with the tide. A school of Star-fish will often settle down on an oyster bed and destroy it in a few hours. Each fish will get on the top of an oyster, surround him with his feelers, and when the oyster opens his shell he is speedily devoured. Besides feeding on mollusks the Star-fish eats dead fish and decaying matter, and in this way serves as a scavenger in the water. The baby Star-fishes are not the least like their papas and mammas. They come out of red or yellow eggs, are ovoid in shape, and have no rays. They are livelier than most babies. In the tank at the Aquarium are yellow-backs and red-backs, purple and gray—their variety and intensity of coloring being as beautiful as a basket of newly gathered roses. I was very much surprised the other day in seeing one of them move off deliberately and leave one ray.. Then there is the "brittle-star" who, when not able to resist an attack, shatters himself to pieces. You will not lament the fact, however, when I tell you that each fragment becomes a perfect fish in the course of time. I often used to wonder if this voluntary dissection was painful, but they do it so quickly and easily that I have concluded it cannot be. I think it is on the principle of "can't be beat," and really admire their pluck.

Ida B. Roberts.

Written for the Aquarium Journal.

HOW WE CAPTURED DAGO.

There is no person living more generally superstitious than an old sailor, and of all his quaint ideas there are three in particular in which his belief admits of neither denial nor argument. The first is that an egg shell must never be thrown overboard unbroken, because a witch may sail in it and raise a storm; the second is, never to whistle during bad weather, because to do so infallibly brings on a gale; and the third is, that for a shark to follow a ship persistently is a bad omen, for sooner or later somebody on board will surely fall into his jaws. Hence Jack compels the ship's cook to crumble egg shells finely before throwing them away; never whistles, and sternly discountenances that amusement save in a dead calm; and wages relentless warfare on sharks whenever an opportunity is afforded him.

CAPTURE OF THE SHARK.

It was once the writer's fortune to be aboard a U. S. Man-of-war, belonging to the Brazilian squadron, which had been detailed to cross over to the African coast and visit a few forts between St. Paul de Loando and Capetown, for the purpose of showing the flag in this out-of-the-way part of the world, and thus adding to the dignity and importance of the few consuls whom Uncle Sam sends thither. The sea on the west coast of Guinea literally abounds in sharks of the largest size and of appetites of proportionate capacity, and consequently on nearing land half a dozen or more triangular fins slipping through the water astern of the ship indicated that the monsters had already scented the refuse thrown overboard, and had made up their minds to accompany us as long as the food supply lasted. An economical provision of the Government forbids the men-of-war steaming while at sea, and consequently, with no other means of locomotion than sails, a protracted spell of exasperating calms found us drifting at a snail's pace leisurely to the southward. Our convoy of sharks thus had no difficulty in keeping with us, while the crew, on the other hand, soon learned to know them, and sailor like, after a while christened four of the largest by the names of Dago, Swab, Rock Scorpion and Soger. The last is the nautical pronunciation of the word "soldier," otherwise a marine for whom Jack has a traditional detestation; "Dago," is the generic name applied to all foreigners who perversely fail to understand plain English; and the other epithets are likewise severe ones to the tarry vocabulary.

Of these four Dago was the largest and likewise the boldest. At first he, in common with the others, believed the ship to be some unknown monster from which it were best to keep at a respectful distance. But afterwards, probably because he discovered that the vessel always was running away from him, he became inspired with a contempt for her huge proportions, which he manifested by running his nose against the rudder and occasionally biting a mouthful from any stray rope which happened to trail overboard.

The sharks had been following the ship for some ten days when it became evident that something was troubling the minds of the ancient mariners of the crew. Numerous solemn conclaves might be seen in session under the to'gallant forecastle, in which the boatswain's mates and the quarter masters of the watch below did the talking, and the select few who were admitted to the privileges of their society—and no one who did not rate on the ship's books as an able-bodied seaman could aspire to that honor—respectfully listened. Any one disposed to play eavesdropper might soon have learned the subject of these solemn deliberations. "Them ere sharks" were clearly the trouble, and the upshot of one unusually protracted session was that a boatswain's mate was appointed a committee of one to "go to the mast" and there request permission of the First Lieutenant to capture the redoubtable Dago.

A hot, sultry afternoon, when not a breath of wind was stirring, while the sails were flapping loosely from the yards, and a general atmosphere of somnolence pervaded the ship, which, like a huge cradle lazily rocked on the long Atlantic swell, was selected as a proper time for the boatswain's mate to make known the general desire. The First Lieutenant, nothing loth to have the men aroused from the sleepy indolence to which they were becoming too well accustomed, readily granted permission; and presently the gathering of a knot of officers at the stern, and the proceeding of half a dozen men to break out the necessary tackle from the store room, aroused the curiosity of the crew and set all hands scrambling up the mizzen rigging to witness the sport.

Dago that day had been more than usually impudent. He had committed the unpardonable crime of eating the captain's hat—an immense straw affair wherewith the skipper shielded his complexion from the burning sun, and which a rope swinging from aloft had knocked from his head, overboard. He had also bitten off the lower part of the swinging Jacobs-ladder which somebody had carelessly left fall over the stern, and now he was disporting himself under the cabin windows, occasionally showing his white stomach as he rolled over to grab some stray floating morsel and turning his wicked blue eyes up toward those who were watching him, as if longing for some fat sailor to follow the fate of the hat.

The procession returning from the store-room might now be seen advancing toward the lee side of the poop deck The boatswain's mate who headed it carried a boat's grapnel, which consisted of four heavy iron prongs attached to a single stout shank—the latter some two feet in length. This was the shark hook, and the bait in the shape of a tempting lump of fat pork, was securely lashed on the bends. To the ring at the extremity of the shank was fastened three or four yards of strong chain—for the shark would quickly bite through any rope which impeded his movements. Lastly, to the end of chain a new rope was secured and this was carried by the remaining participants in the procession. The gigantic hook was brought to the stern and after allowing plenty of slack line for it to drift, the rope was belayed to a strong cleat and a man stationed by it to see that it did not slip. "All ready, sir," reported the boatswain's mate to the officer of the deck, touching his cap with one hand and poising the grapnel with the other.

"Very good, heave away!"

Splash! went the hook into the water, and as it sank it slowly drifted astern until brought up by the line.

Whether Dago suspected something wrong is not known, but he certainly failed to grab at the object as was his wont. Perhaps the indigestible nature of the captain's hat deterred him from hastily seizing another big morsel. Accordingly, he approached the hook in the most gingerly manner—even stopping to crowd out of the way an impulsive young shark who intended preceding him, and swimming leisurely round about the bait as if to consider the question of the advisability of swallowing it, in all its bearings. Had it been his frequent meal of a deck swab dropped overboard by some careless "after-guardsman," he probably would have this time forgone the feast. But the smell of the pork was too much for him — the greasy aroma indicated unalloyed bliss to the carcharian palate—there was no Panama straw about it to tickle his gullet and make him cough, and no wet rope yarns to clog up his teeth. He hesitated—the aroma grew fainter as the bait receded—Soger and the Rock Scorpion were already about to clutch it. With a stroke of his tail he shot forward like an arrow—his white under side glanced as the light fell upon it. Those watching him could see the terrible mouth with its row upon row of keen saw-like teeth close over the hook.

"Stand clear of the line!" said the officer of the deck quickly, and every one moved away from the rope which was now flying out over the taffrail with lightning speed. Dago had taken the dose—but had not yet felt its effects and he was making off with his prize to avoid the solicitous attention of Soger and company.

Thud!

The end of the tether was reached, and the.

rope under the powerful strain rose partly out of water, and quivered as the drops flew from its tense strands.

"Don't slack an inch" was the order, as Dago, in whose jaw the keen prongs had firmly imbedded themselves, began a series of contortions and headlong rushes, which must have impressed Rock Scorpion and the rest with the idea that he had gone crazy and was dangerous, for without waiting to investigate the pork question further, they beat a precipitate retreat. For upwards of ten minutes Dago, utterly regardless of pain, sought to tear himself free of the hook, then he rolled over and bit viciously on the chain. Finally he stopped, as if to gain strength for more desperate struggles—this was the watched for moment.

"Man the line," briskly ordered the officer. In a trice the rope was off the cleat and held in a dozen hands; just then Dago made a new rush and for a moment it seemed as if the rope must be torn from the men's grasp. But despite their being dragged sliding over the deck, they held on manfully until more of the crew could come to their aid. Then each man grasped the rope with both hands, as if it were the topsail halliards, turned his back to the shark and at the word all walked forward. Dago was no match for the strong, steady pull—curve his body, swim to the opposite direction as hard as he might, he slowly was dragged to the ship and at last his great snout could be seen in the midst of a whirlpool of foam, protruding from the water just under the stern. The pull on the rope was now arrested until a noose could be made with another line, and this as the shark was lifted flapping was deftly slipped down around his fin. Thus hampered, it was an easier matter to control him.

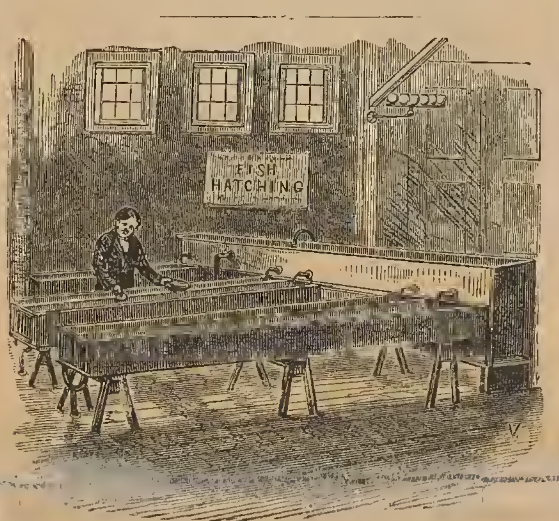
"Run away, lads," came the order. The man at the rope broke into a run and his sharkship was jerked up on the poop, slid along it, bounced down on the quarter deck in a way that must have sadly disarranged his breathing apparatus, and then hauled rapidly forward until the forecastle was reached. Despite the rough handling he had undergone he evidently felt none the worse, and he meant that his captors should understand the fact. True he could not swim, but he could launch out with his tail in the most spiteful manner, and his jaws clashed together in a way that boded ill to any one who might come within their reach. Besides, after a moment or two of rest, he seemed to regain fresh energy and he began to flap and jump about with a vigor, that induced the sailors to leave him in undisturbed possession of a large area of deck.

Finally the boatswain's mate waited his opportunity and with a keen hatchet delivered a telling blow at the root of the tail. This was a quietus and Dago now might undergo the torture which awaited him, without the consolation of struggling against it. Jack knows how much mercy to expect from a shark in case he should fall into the clutches of the fish and he metes out a return with rigid justice. Hardly had Dago's motion ceased when a dozen sheath knives were at work on his carcass. One old sailor who bore on his body the marks of a bite made by a shark that had leaped after him as he was scrambling into a boat after an involuntary bath, plunged his blade again and again into the quivering flesh and finally dug out the eyes. Another cut steaks from the living body with butcher-like precision; a third busied himself in dissecting out the back-bone, which when properly prepared makes a valuable walking stick. The stomach was opened and there was the captain's straw hat badly ripped in places but otherwise whole and embedded in an astonishingly heterogeneous collection. An empty soda-water bottle, two crabs, vegetable refuse, and bits of rope, were combined in an undigested mass which, if sharks suffer from dyspepsia, must have produced prolonged misery.

Even after all the mutilation above described was accomplished life still remained. The tail wriggled fitfully for some time after it had been cut off, and the jaws snapped feebly until the head had been hacked clear of the body. Jack regaled himself on shark steaks *ad libitum* for supper, for he has no compunction in devouring his enemy, whose flesh though coarse and rank is a not disagreeable change of diet, after long continued rations of government pork and "salt-horse."

Dago's flesh, which did not find its way into human stomachs, furnished an agreeable supper for Rock Scorpion, Soger and Swab. He did bring bad luck after all, for the tars who possessed themselves of his skull and back-bone, after cleaning them with infinite patience, traded them off to a Capetown rum-boatman for rum, got surreptitiously but gloriously drunk and on detection expiated their spree in irons in the "brig" during the whole stay of the ship in port.

PARK E. BENJAMIN.



FISH CULTURE AT THE AQUARIUM.

The visitors to the Aquarium have manifested so earnest an interest in the fish-hatching department that it is with especial pleasure that we improve this early opportunity of laying before our readers an official report of progress. Although the management of this department, with all the preliminary arrangements, was placed in the hands of one whose long experience and thorough acquaintance with the subject gave promise of success, yet owing to certain novel features the attempt was at best an experiment. That it has proved an eminently successful one appears from the following report of Mr. MATHER, which was read before the recent annual meeting of the American Fish Culturists' Association, and which, as the reader will learn, is of a most encouraging character, reflecting credit on the superintendent and special gratification to the manager and the public. The following is the report in full:

MR. MATHER'S REPORT.

Sixty thousand eggs of the California salmon were received in the month of October to be hatched for the United States Fish Commission. They were packed in moss on the McCloud River, Cal., by Mr. Stone, in the usual manner, and arrived by express in good order, with a loss of not over three per cent. Of these eggs, 8,200 died, or were killed before hatching; and I will here say we had a difficulty to contend with that is not met with in an ordinary-hatching house, viz.: handling eggs by visitors. In the State and other establishments there are no more people than the attendants can watch; but in the crowds at the Aquarium it has been a common thing to find that while talking to one party another by your side has a handful of eggs going off to the window to examine them, and which were invariably killed. To remedy this I made the water deeper, which lessened the current, and was consequently injurious to some eggs and fatal to those of the whitefish. The salmon eggs were received October 11, and all hatched by November 4, the water ranging from 60° at first, and steadily dropping to 54°. It is worthy of note that while the time of hatching from the first one out of the egg to the last was only eighteen days, the difference in the time of absorption of the umbilicus was nearly forty days; that is, the first fish took food Dec. 19, and all were feeding by Feb. 1, excepting, perhaps, a dozen individuals, whose sac was only half gone. By the 1st of January the temperature had lowered to 40°, and has since stood at 38°. Some of these salmon have been distributed to New Jersey waters, others to Long Island, and the remainder are destined for a lake in Northern New York.

I would call attention to an experiment made in feeding in the Aquarium. A month ago 500 of these salmon were put in one of the small tanks in a temperature of 60°, or 22° warmer than those in the hatching troughs where the Croton runs, and a great difference in size can now be seen, those in tank No. 18 being much larger than the others of the same age in the colder water of the troughs. This bears on the question of their adaptability to Southern waters. We have also received 25,000 eggs of the whitefish from Mr. George Clark, Commissioner on Fisheries for Mich.; these, with 10,000 from Seth Green, were lost for want of circulation as noted above; 5,000 more have just been received by favor of Mr. A. J. Kellogg, also of the Mich. Commission, which will be put in a jar and hatched in bulk; 15,000 eggs of the Cisco or Lake herring have been received from O. M. Chase, Sup't of the Detroit Hatchery, which are doing well; 10,000 eggs of the Lake trout, from the New York House at Caledonia, are still in process of hatching; 2,000 eggs of the land-locked salmon have been received from Prof. Baird, and are placed in one of Ferguson's hatching jars, which has been presented by the inventor.

In the salt water department, in tank No. 12, can be seen the curious eggs of the skate, or ray, with their yolks visible when a light is placed behind them; they are supported by a string in a good flow of water, and in nearly the same manner as they are hung upon seaweed. Whether these eggs are impregnated or not, I am unable to say, as they were laid in the great tank by the fish, and their development is not far enough advanced to determine with certainty. A great many valuable experiments can be conducted in an aquarium, both in salt and fresh water, that would be difficult at almost any other place, and we wish the hearty co-operation of fish culturists all over the country, and will be glad to work with them and perhaps try the same experiments under different conditions of temperature, light, etc., that they may be conducting, and so arrive at results in the shortest space of time. Mr. Coup is disposed to place the whole Aquarium at the convenience of practical or scientific men, to aid them in any studies or experiments that they may wish to pursue.

The Department of Fish Culture is under obligations to Mr. Wilmot for 1,000 eggs of the Ontario salmon (*S. Wilmoti*); also to Prof. S. F. Baird, U. S. Com. on Fisheries; Hon. Robert B. Roosevelt, Com. for New York; Geo. Clark, Ecorse, Mich.; Seth Green, Rochester, N. Y.; Monroe A. Green, Mumford, N. Y.; A. J. Kellogg, Detroit, Mich.; O. M. Chase, Detroit, Mich.; Samuel Wilmot, Ontario; Livingston Stone, Charlestown, N. H.; T. B. Ferguson, Baltimore, Md.

A COMPLETE INDEX OF ALL THE FISH IN THE TANKS.

The following tabulated list is designed, with the assistsnce of the accompanying ground plan, to serve as a guide or index to the Aquarium Tanks, and although it will be revised monthly, allowance must be made for such changes as may be found necessary during the intervals between the dates of publication.

SALT WATER TABLE TANKS.

Tank 1.—Tidal Tank.

Tank 2.—Porgies.

Tank 3.—Toad Fish, Smooth-browed Bull Head, Winter Flounder, Tautog, Sea Raven.

Tank 4.—Sea Raven, Spider Crabs, Rock Crabs, Pectens, Algae, Sea Urchins, Anemones.

Tank 5.—Hermit Crabs, Spider Crab, Pectens, Lebias, Algae, Cunner, Sea Urchins, Anemones.

Tank 6.—Star-fish, four varieties, Pectens, Algae, Barnacles, Anemones, Cunner, Spider Crabs.

Tank 7,—Serpula, Living Sponges, Anomias, Bryozons.

Tank 8.—Anemones, four varieties, Algae, Livng Corals.

Tank 9.—Crabs, 7 varieties, Young Lobsters.

Tank 10.—Young King Crabs, Spider Crabs in uniform, Little Hermits, Young Black fish, Young Sea Toads, Algae, Young of Edible Crabs,

Tank 11.—Lafayettes, Algae, Little Hermits, Pear Snails.

Tank 12.—Sheepshead Lebias, Algae, Serpula, Periwinkle Spawn, Skates' Eggs, Bottle Fish.

FRESH WATER TABLE TANKS.

Tank 13.—Carp, Black-nosed Dace, English Roach.

Tank 14.—Lung-Tsing-Lu or Japanese Telescope Fish.

Tank 15.—Sticklebacks.

Tank 16.—Blind fish and Craw fish from Mammoth Cave.

Tank 17.—Banded Proteus.

Tank 18.—Young California Salmon, hatched in the Aquarium Dec. 4, 1876.

Tank 19.—White Perch.

Tank 20.—Axolotles.

Tank 21.—Blind Proteus, Lamprey.

Tank 22.—Hell Benders.

Tank 23.—Common Sun fish.

Tank 24.—Black Bass.

Tank 25—Pickerel.

Tank 26.—Brown Cat fish.

Tank 27.—Young Salmon.

POST TANKS.

Tank 28.—Sticklebacks.

Tank 29.—Tadpoles, Carp.

Tank 30.—Cat-fish and Carp.

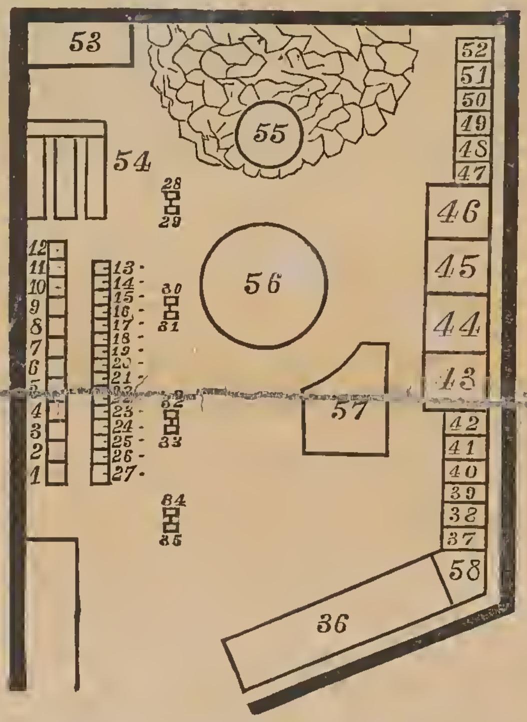
Tank 31.—Algae, Unio.

Tank 32.—Fresh water Lobster, Dace.

Tank 33.—Crimson Spotted Triton.

Tank 34.—Black Headed Dace.

Tank 35.—Coral, Algae.



Ground Plan of the New York Aquarium.

SALT WATER SERIES.

Tank 36.—Spotted Skate, Summer Skate, Spotted Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog, Ling, Large Surf Bass.

Tank 37.—

Tank 38.—

Tank 39.—Anemones, Sponges, Spotted Codlings, Porgies, Killies, Hermit Crabs, Flounders, Coral, Shells.

FRESH WATER SERIES.

Tank 40.—California Salmon, Lake Trout, Brook Trout.

Tank 41.— Yellow Perch, Brook Pickerel, Blue Cat-fish, Rock Bass, Common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass, White Suckers, Wall-eyed Pike, Spotted Perch.

Tank 42.—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank 43.—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Long finned Chub Sucker, Wall-eyed Pike, Lake Pickerel, Black Bass, White Fish, Rock Sturgeon.

SALT WATER SERIES.

Tank 44.—Shoal of Striped Bass, Black fish, Sea Perch.

Tank 45.—Deep Sea Cod.

Tank 46.—Blackfish, Striped Bass, Lafayette, King Crab, Skates.

Tank 47.—Flounder, Tomcod, Toad Fish, Sculpins, Gurnard.

Tank 48.—Lobster, Lady-crab, Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank 46.—Spotted Cod Lings.

Tank 50.—Rock Cod.

Tank 51.—Black Sea Bass, large Lobster.

Tank 52.—Lobster, Striped Bass, Porgies, Lafayette Fish.

Tank 53.—Brook Trout, Salmon Trout, California Salmon, Kenebec or Atlantic Salmon.

Tank 54.—Fish hatching troughs.

Tank 55.—Sea Lion.

Tank 56.—Alligators,

Tank 57.—Seals.

Tanks not numbered contain the Salamanders, Japanese Turtle, Otters, Bladder-nosed Seal, &c. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions, or from the extra sheet here added.

OUR DRAG NET.

A PROMISING lad who makes his home with his parents in this city desired to improve the skating before it was everlastingly too late, and was full of trouble because there was a skate strap missing. He hunted the house, high and low, to no purpose; then, after a moment's deliberation, appealed to his maternal ancestor: "Mother, where is that strap you licked me with last Sunday?" She found it, and it looked twice as good to that boy as on the Sunday referred to.—*St. Paul Pioneer Press.*

THE expressions of grief are manifold and its degrees are various. "You look sad to-day," said one who was sympathetic to his neighbor, on whose cheek he discovered the glistening dew drop of a great sorrow. "And well I may," was the touching reply, "for within six months I have lost two horses and my wife. I tell you I feel pretty bad." Then, heaving a deep sigh, he continued, "and they were mighty good horses, too."

A PITTSBURG paper speaks of a young man "who shot himself in the West End one evening last week." There is nothing like being explicit. The young man is severely but not fatally wounded; but if he had shot himself in the Southwest end, and a little Northerly, veering Southeasterly, there would have been no hopes of his recovery. —*Norristown Herald.*

Two French ladies are conversing on the qualities and demerits of their own fair sex. Said one, with a twinkle in her beautiful blue eye, "I have never known but two women who were really perfect." "Who was the other?" asked her companion, with a smile on her fine thin lip.

SINGULAR phenomenon—The man whose feet were so large that he had to put his pants on over his head, has got a boy so bow-legged that his breeches patterns have to be cut with a circular saw.

THE present style of weather calls to mind the remark of a sable brother, that "he had 'mos' allers noticed if he lived fro de month of March he lived fro de year."

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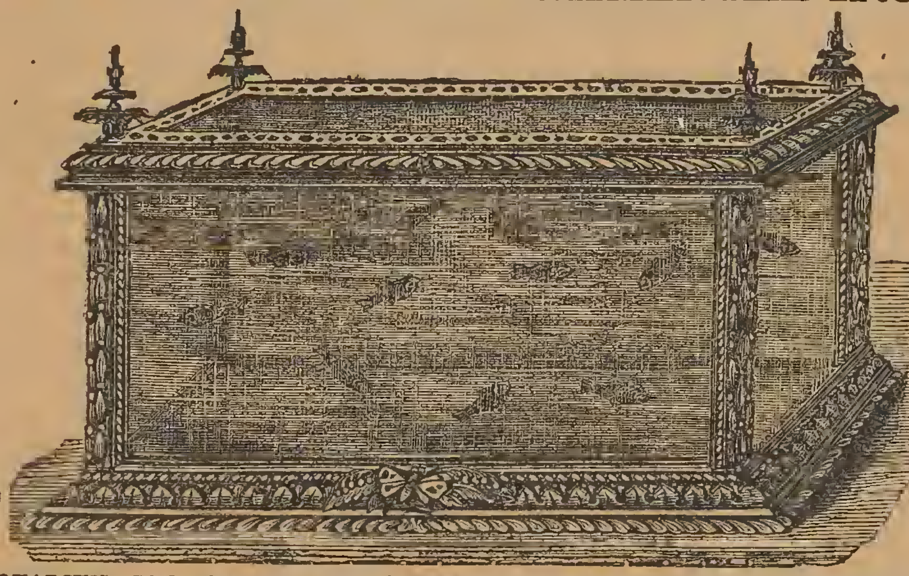

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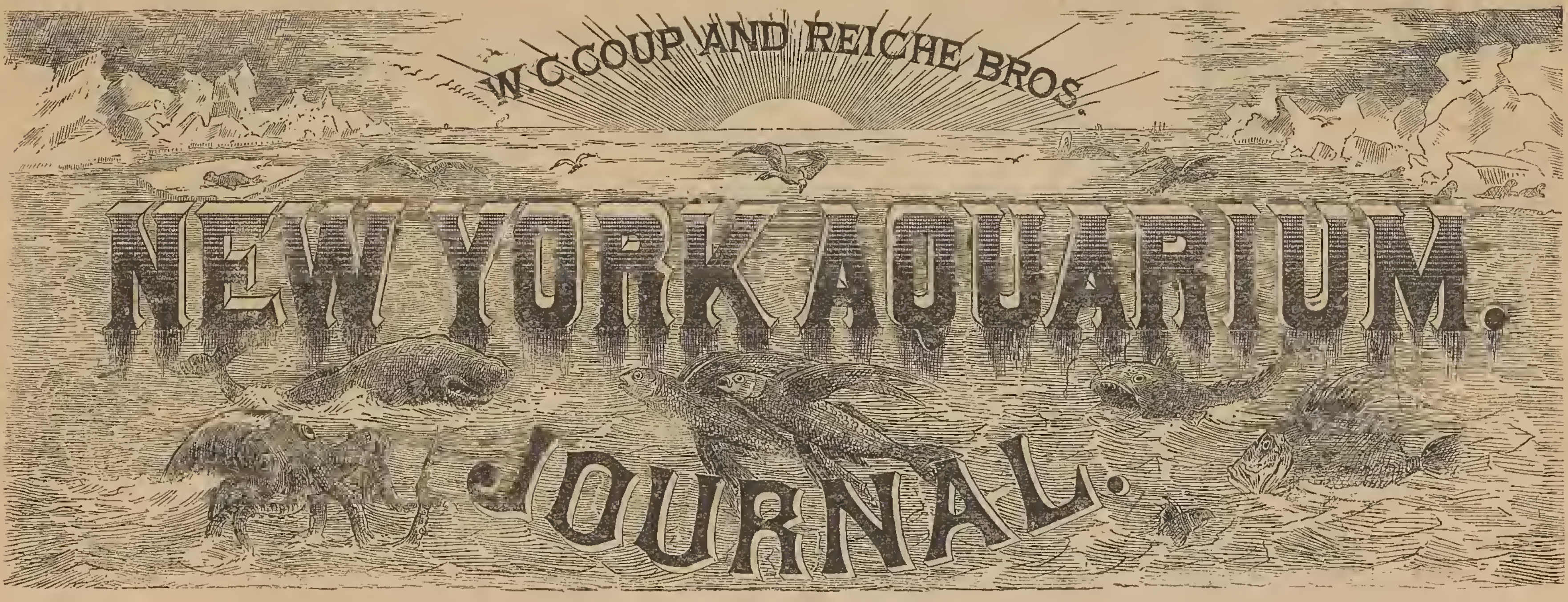


W. C. COUP AND REICHE BROS.

NEW YORK AQUARIUM.

JOURNAL.

Published Monthly at the New York Aquarium, cor. 35th Street and Broadway.

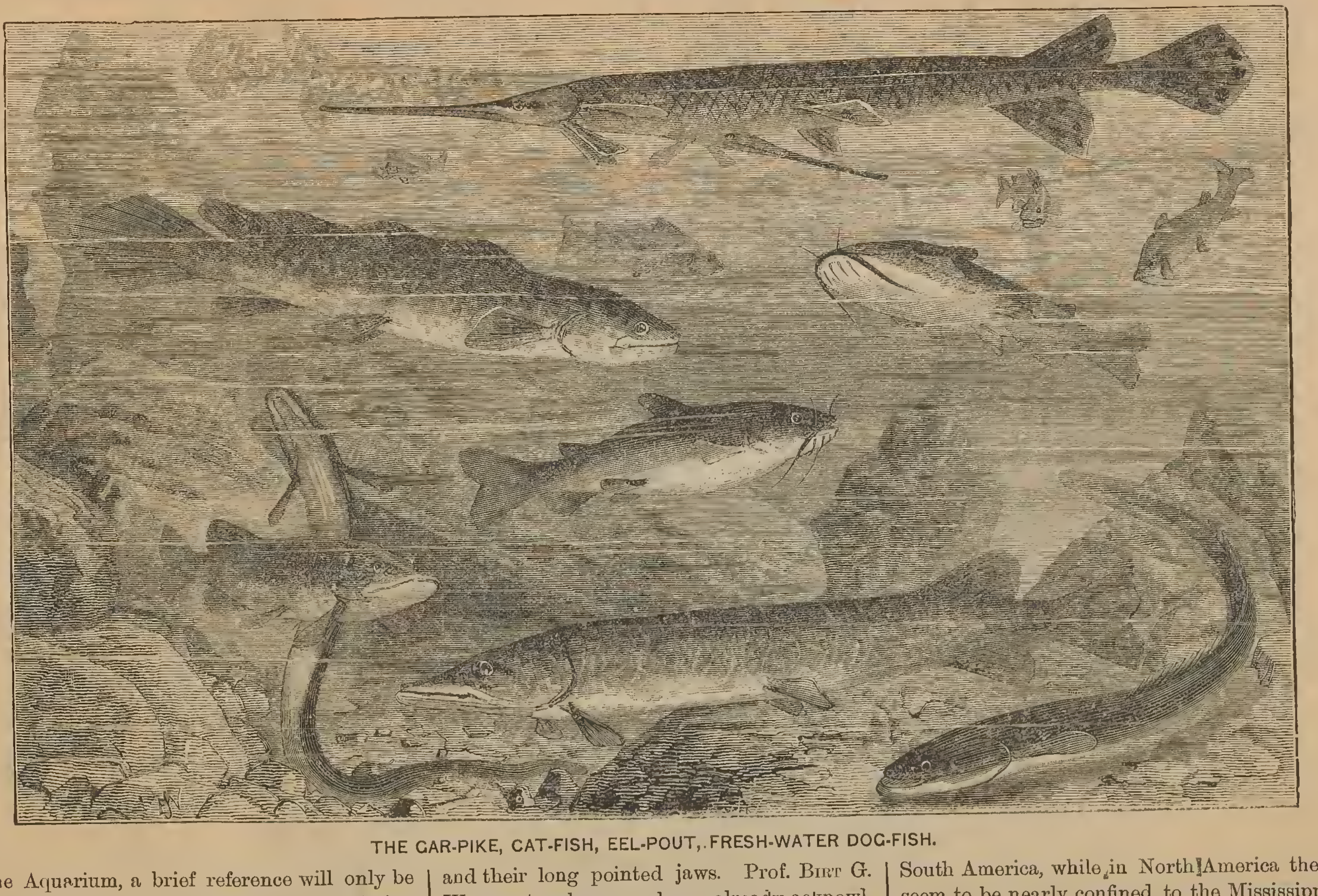
VOL. 1. NEW YORK, MAY, 1877. NO. 10.

A FEW FRESH WATER FISH.

So faithfully has the artist, whose work is before us, performed his duties, that it will not be needed to add to his truthful portrayal of these fresh water fish any extended description of their forms and external peculiarities of structure. In directing attention therefore, to several of the more interesting species of the fresh water fish now to be seen at the Aquarium, a brief reference will only be made to certain characteristic points relating to their internal structure or their special habits. In the great fresh water tank 43 we find an interesting company of these native fish, many of which will be recognized as those with which every American is familiar, while a few may be, and doubtless are, new and strange to the eastern visitor.

To this latter class belong the gar pikes, two of which [illegible] illustration, occupyi[illegible]per space, and readily to be recognized by their slim bodies and their long pointed jaws. Prof. BIRT G. WILDER, to whom we have already acknowledged our indebtedness for services rendered, has in the May number of the *Popular Science Monthly* given an exhaustive review of the habits and structure of this interesting and peculiar fish, and as the specimens in the Aquarium are very fine ones the reader can supplement the information given by Prof. WILDER by a personal examination of the fis[illegible]

True gar pikes, we are here told, are not found in Europe, Asia, Africa, Australia or South America, while in North America they seem to be nearly confined to the Mississippi river and its tributaries. The body is described



THE GAR-PIKE, CAT-FISH, EEL-POUT, FRESH-WATER DOG-FISH.

as being an elongated cylinder covered with hard shining scales joined, and leaving as vulnerable points only the throat and gills, the eyes, and the part just under the pectoral fins. The head, which at the first view is the most marked feature, is furnished with jaws of great length, and hence the name, gar-pike—gar signifying a dart or pointed weapon. Much ignorance prevails as to their food and habits of capturing it. The structure of the jaw would seem to indicate their ravenous nature, but Prof. WILDER found in the stomachs of two, taken in the Illinois river, only a few grasshoppers. These jaws are furnished with rows of very sharp and closely set teeth. Little is yet known of [illegible] feeding, though it is hoped that the observations now being made at the Aquarium may serve to enlighten us on this point. The gar-pike (*Lepidosteus osseus*) at times attains a length of five feet. In addition to these species there are the short-nosed and alligator gars, which, as their names indicate, have short and broad snouts; and the latter of which grows to a size exceeding either of the other species, and are found in the southern part of the Mississippi valley. The gar has a peculiar habit of extending its snout above the water at regular intervals and emitting a large bubble of air. In the confinement of the Aquarium this habit has not, however, been specially noticed, though it has been observed that they still prefer to remain near the surface, which position the artist has assigned to them in the sketch. For food the gar is not regarded with favor, though it is sometimes eaten at the west.

SALMON, LAKE TROUT, BROOK TROUT YELLOW PERCH, ETC.

As it is not our purpose to give more than a brief reference to the fish which the artists have chosen as subjects for their illustration, we will be compelled to forego a more extended reference to this interesting species. With the remaining fish figured in the first illustration, the reader is doubtless thoroughly familiar, excepting possibly the so-called fresh water dog-fish, which was secured in the Detroit River, and which may be recognized by its long dorsal fin. Good specimens of this fish and the others figured in the illustration may be seen in fresh water tank, No. 43.

THE FRESH-WATER SHEEPS-HEAD, DOG-FISH, PERCH AND SUN-FISH.

Passing to the second illustration we find ourselves again among old acquaintances, since the salmon and the lake and brook trout have become thoroughly at home in tank 53. In addition to these larger specimens the young of these fish have all been hatched in the neighboring troughs, and not only does the visitor know "what they are," but can also tell by actual observation "from whence they came."

Again, in the third sketch, we find so faithful a portrayal of other species that hardly is a reference needed. In closing we are prompted to state, however, that the manager of the Aquarium deserves our sincere congratulation in the success which has attended his effort to procure and preserve these many valuable and interesting specimens for our native fresh water fish. Though many of them were captured at a great distance and transported under peculiar difficulties, the losses among this class is below what might have been expected, though a like good fortune has not attended his efforts with certain other varieties. A persistent determination to accomplish his purpose will, however, soon be rewarded by the presence of a whale, shark and octopus, not to mention many new and rare varieties of the smaller, though hardly less interesting, forms. Included among these latter are the many rare and beautiful species of sea anemones, a collection of sea-horses and also a full display of the many-hued tropical fish from our Southern coasts and the West India islands. These coming wonders, together with those now presented, will serve to confirm the statement that the New York Aquarium, though but six months old, is yet an institution of which the manager and our citizens may justly be proud.

W. S. W.

FISH IN FACT AND FABLE.

4.

THE NAUTILUS.

This is the ship of pearl white, poets feign,
Sails the unshadowed main—
The venturesome bark that flings
On the sweet Summer wind its purple wings,
In gulf enchanted, where the siren sings,
Where coral reefs lie bare,
And the cold sea maids rise to sun their streaming hair.

Thus sings Dr. Holmes, in one of his sweetest poems, of the nautilus, the most beautiful of sea-wonders. It dwells chiefly in the Mediterranean, and when the sea is calm it may be seen floating along the surface, sometimes spreading its tiny sail, sometimes rowing with its oar-like arms, or again floating on its mouth like a ship with the keel upward. Alexander the Great was the first to notice these little mariners and, struck with their peculiarity, gave them the name of Argonauts, from the famous Grecian fleet. From that time onward poets have written and sung of their mysterious vessels.

The Nautilus and the ammonite,
Were launched in storm and strife,
Each sent to float in her tiny boat,
On the wild, wild sea of life.
And each could swim on the ocean's brim,
And anon its sails could furl,
And sink to sleep in the great sea deep,
In a palace all of pearl.

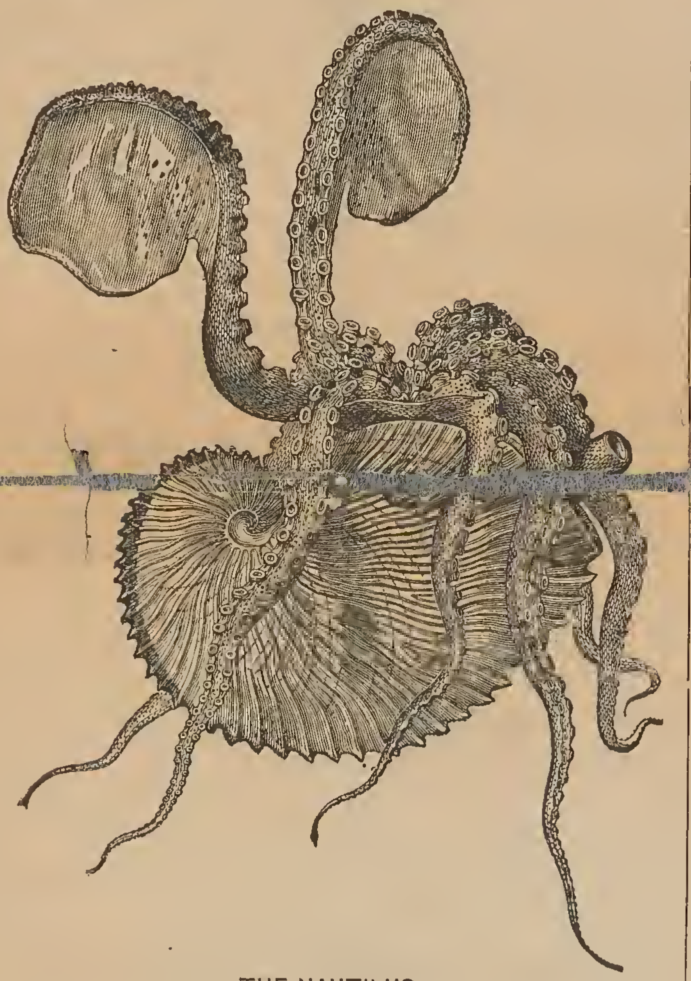
The shell of the pearly Nautilus has been an object of interest and admiration since its first discovery. One was dedicated to Isis and kept in the sacred Egyptian temple; another was preserved by the Greeks as a most precious treasure. One was made into a drinking cup, curiously engraved with delicate devices by skillful artists, who thus brought out in cameo relief the pearly substances of the shell beneath. This exquisite specimen of workmanship is still preserved. The subject of the decoration is the triumph of Neptune and Amphitrite. This device was particularly appropriate as the Nautilus was specially dedicated to Venus, and is often spoken of as her fairy car. There is a charming little Greek poem, written on the occasion of the offering of a nautilus at the shrine of Aphorbite by Silonea, the daughter of a nobleman of Smyrna. The poet seems to have shared his devotion equally between the heavenly and earthly goddess. He begins thus:

A sacred shell, Venus divine,
Fair Silonea offers at thy shrine;
And thus thy Nautilus is doubly blest,
Since given by her and still by thee possessed.

Venus, however, does not exercise such protecting power as she ought over her little fleet, for after every storm the shores of the Mediterranean are strewn with the empty shells, which have floated pilotless and rudderless at the mercy of the gale, until dashed to pieces on the rocks, or, more fortunate, washed up on the sandy beach.

Its webs of living gauze no more unfurl;
Wrecked is the ship of pearl!
And every chambered cell,
Where its dim dreamy life was wont to dwell,
As the frail tenant shaped his growing cell.
Before thee lies revealed,
Its irised ceiling rent, its sunless crypt revealed.

The chambered nautilus inhabits a shell which is divided into forty partitions that communibate with each other by minute doors or openings, scarcely larger than a goose quill. The body of the nautilus is divided into as many parts as there are hambers in thee cell, and all the parts communicate with each other by a long cord running from head to tail, so that the body taken out of the shell would look like a long row of pearls on a string. It seems impossible with this strange formation that the nautilus should ever leave its shell, and no one has been able to explain just how it forces its body through the doors, which are not half its size; but the fact is certain, and the theory is that it removes the substance of one section up into the next, and thus moves out of its house one story at a time.



THE NAUTILUS.

Year after year beheld the sunless toil,
That spread its glittering coil;
Still as the spiral grew,
It left the past year's dwelling for the new,
Stole with soft steps the silent ant way through;
Built up the idle door
Stretched in his last found home and knew the old no more

The moral of this little creature's life is so gracefully and poetically drawn that we cannot leave the subject of the chambered nautilus without quoting the final verses:

Thanks for the heavenly message brought by thee,
Child of the wandering sea;
Cast from her lap forlorn!
From thy dead lips a clearer note is born
Than ever Triton blew from wreathed horn!
While on mine ear it rings.
Through the deep cares of thought I hear a voice that sings.

Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last,
Shut thee from heaven with a doom more vast;
Till thou at length art free,
Leaving thine outgrown shell by life's unresting sea!

The argonaut, called the paper nautilus, from its thin, white, delicate shell, has eight arms, two of which are spread out into broad membranes. These are the arms which in tradition were called its sails, while the others were supposed to act as oars.

Pope speaks of the art of navigation as learned from the nautilus:

For thus to man the voice of Nature spake:
"Go, from the creatures thy instructions take;
Learn of the little nautilus to sail,
Spread the thin oar, and catch the flying gale."

Recent observation, however, have dissipated the fancies of poets, and the enchanting illusions of myth, for science has determined that the movement is caused not by motion of net or arms, but by pumping water in and out of the bronchial cavity, the arms meanwhile firmly grasping the shell. Sometimes the nautilus walks about on the sandy floor of the deep sea, carrying her shell on her back like the snail, and crawling about in comfortable security.

For who can walk where the nautilus hides,
When her silken sails are furled;
Where retreat in their fury the baffled tides,
From the shores of this upper world?

When she rises to the surface, however, she is extremely timid, and if suddenly alarmed, her arms lose their hold of her boat and it floats away, leaving her to sink mournfully into the sea; but in death, as in life, she finds a poet to sing her praise, and it might almost console her for her untimely end, could she listen to her own requiem:

Farewell, beauteous mollusk, the day's fairest daughter!
Thy dirge faintly soundeth from out the deep sea;
From the halls of the Nereids far down in the water,
And sad are my thoughts, O my lost one! of thee.

The music and stars, 'mid the rush of the wild waves,
May guide thy frail bark through the night glowing sea,
But alas for the Nereid who watch in sea the caves,
The bark and its pilot they never shall see!

Rachel Farley.

IN SEARCH OF A WHALE.

Lest any visitors to the Aquarium should have found themselves inconsolable at the untimely death of the whale, it may be a relief to tell them that efforts are being put forth to replace his majesty with another of the same royal race. An expedition has been equipped and dispatched to a distant region at the North, with instructions not to return without one or more captive cetacea.

Although it is possible and not improbable that some months may elapse before the prize is secured, yet it is also possible that before this announcement reaches the reader, the whale may again be one of the numberless features of interest at the Aquarium. In the meantime, it is, perhaps, needless to remind our friends that though without a rival in size, yet the whale is by no means the most wonderful creature which swims the seas; already may there be seen at the tanks a score or more of marine wonders, equally rare, and for certain reasons still more curious and wonderful than the biggest of whales.

W. C. COUP AND REICHE BROS.
NEW YORK AQUARIUM.
JOURNAL.

W. S. WARD, Editor.

NEW YORK, MAY, 1877.

THE NEW YORK AQUARIUM JOURNAL *will be published monthly at the Aquarium, corner of 35th Street and Broadway, New York Citv.*

Though intended for distribution among the patrons of the Aquarium, the Journal will also be forwarded for one year, by mail, or delivered by carriers to any address on receipt of one dollar, which sum is a mere nominal one, since it includes postal charge and expense oj mailing and delivery.

All communications should be addressed to W. C. COUP, corner 35th Street & Broadway.

With the present month the NEW YORK AQUARIUM enters upon the second half year of its existence. Opening as it did in the Fall, and at a time when the severity of our climate soon sealed up the lakes and rivers with ice, and compelled even our sea shore fishermen to abandon their calling for a season, it is a fact worthy of notice and commendation that there has been no lack of attractive exhibits in the Aquarium tanks. Now, however, that the season has opened again and facilities for obtaining fish [illegible] multiplied, a word by way of apology and promise may not be out of place.

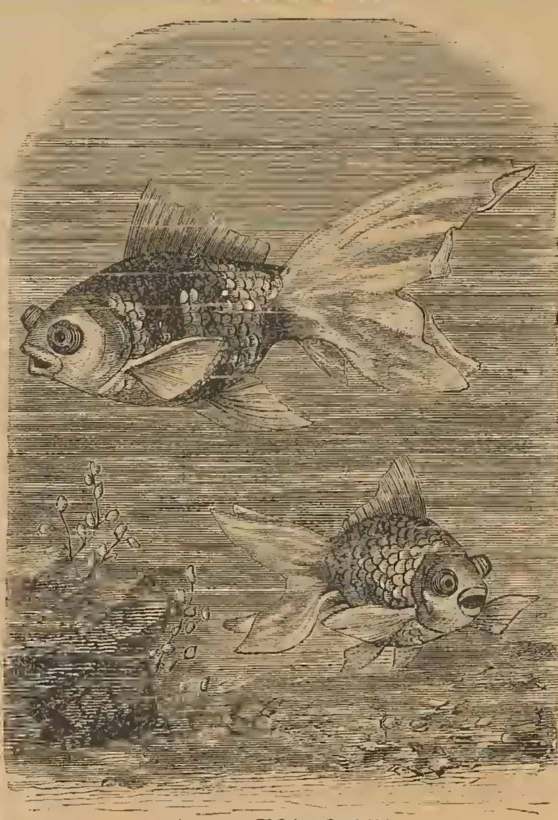
We take it for granted that among the host of satisfied visitors an occasional grumbler may have gained an entrance and departed with a shake of the head and a dissenting voice; and to such a one we have a word of honest inquiry. In the first place, my dear sir, are you aware that of all created creatures the fish is the most delicate and sensitive to change of place? Moreover, has it never occurred to you that owing to the constant activity of their lives, and the wide range of their natural domain, they are of all creatures the most sensitive to any such confinement as is required by an imprisonment in the Aquarium tanks? Then granting the e readily demonstrable facts, is it not due to the manager of such an undertaking as this, that you have the wisdom to commend what is already accomplished, and the patience to await the result of future efforts?

After the great labor and expense attendant upon the construction of the Aquarium, there comes the choice of important and skilled assistants; the establishment of distant stations, and the organization of expeditions and collecting parties. These arduous endeavours over, the work of the season has but begun. The fish must be transported to and delivered at the Aquarium. It is not enough that the director of some distant station inform the manager that such and such a fish has been captured and awaits his orders, but at once, and with no loss of time, must the captured fish be started on its journey. And during this trip never for an instant can it be neglected; an attendant must constantly be engaged in aerating or changing the water, the temperature also being carefully regulated. Should the capture be a large one, such as a shark, whale or devil-fish, care must be taken lest it thrash about till it effects self-destruction; or, if it be a rare selection from the Bermudas, the possibility of storms must be provided for, and, as colder latitudes are reached, some plan must be used to prevent a too rapid fall in the temperature of the water. And, when at last the entrance of the Aquarium is gained, every preparation must be made, so that the new arrival shall not be too suddenly submitted to any unfavorable changes. Then comes the question of food; only so much shall be given as the fish will eat, lest the rejected portions, sinking to the bottom, may decompose and poison the water in which the fish are to live.

And so we might continue directing attention to the difficulties of classification and arrangement, the skill and artistic taste needed to display each creature to best advantage, and finally the continual regulation of the complex system of circulation so that no fish may die from need of air.

All this and more, let it be remembered, had to be accomplished before the opening of the Aquarium in October last, yet the question of continued supply would have been, in spite of all these difficulties, an easy one, but for the fact that Winter was at hand. Soon all nets were up, the fish of the coast had sought deeper waters, and the lakes and rivers were ice-bound and barren. Nothing remained, therefore, but to so nurse, watch over and guard the treasures already possessed, that they should become acclimated and at home in their new quarters. How well this was done a brief review of the catalogue and guide will determine. Here we find that in the face of all these discouragements the New York Aquarium during the first six months of its existence—and Winter months at that—has presented a display exceeding in variety and interest many of the collections in the long-established aquaria abroad. Witness the whale, sharks, salmon, both young and old, the beautiful anemones and star-fish, the ugly but curious sea-ravens, skates and anglers, the proteus, hell-bender and axolotl, and last but not the least, the Japanese ling-tsing-yu and kingiyo. Together with these are the beautiful fish from our fresh water lakes mentioned elsewhere, and with them a full collection of minor, but equally curious varieties of the finny tribe. Let it be remembered also, that in addition to this display of fish, the manager of the Aquarium has never failed to add some special novelty, such as the divers, the trained seal, the microscopic display, together with the musical concerts and scientific lectures.

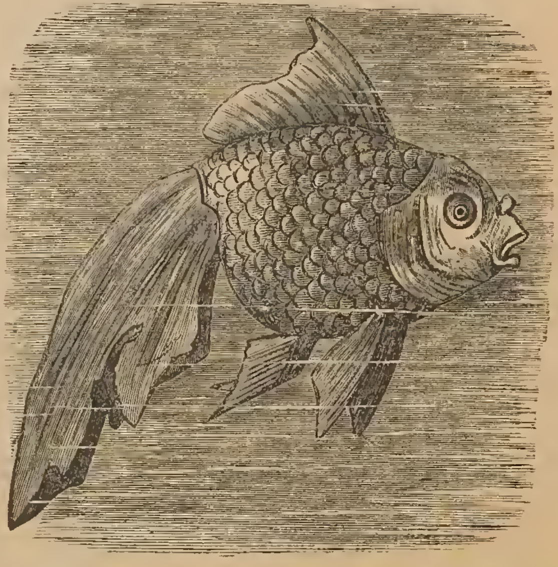
If we have been prompted to thus commend the manager of the Aquarium for his efficient services, the story has also a significance to be heeded by the public; and this can be comprehended by a single suggestion. To be maintained such an institution must be appreciated—to be appreciated it must be seen.



LING-TSING-YU.

A glimpse at the new arrival—Ling-Tsing-Yu—is all that is needed to inform the visitor of its origin. None but the Japs could raise such a grotesque looking beauty, and, having raised it, none but a Jap could christen it with such a name. Those familiar with the graceful beauty, the Kingiyo, whose form is figured below, will [illegible] mark the resemblance in many particulars between it and its rival, the Ling-Tsing-Yu. Whether these mystical three syllables, when interpreted, mean the "big-eyed-fish," we will not venture to affirm. Certain it is, however, that in addition to the long wavy tail which is the special adornment of the Kingiyo, we have the extra wonder of the projecting eyes, which have caused this fish to be called in plain English the Telescope Fish.

The Ling-Tsing-Yu is a species of Golden carp. Its body has all the bright colors of the gold-fish, and adds to this the wonder of the triple tail, and the still greater wonder of the eyes. These latter are mounted on stalks projecting from the sockets, as shown in the



figure, and are the result of breeding and culture. Although the Kingiyo was our first love, the still greater wonder now on view is a sign that the manager of the Aquarium means that each succeeding conquest in the realm of Neptune shall be greater than the last.

FACTS AND FANCIES ABOUT FISH.

FOR OUR YOUNG FOLKS.

TOLD BY UNCLE OCTOPUS.

You are behind hand my young friends this month, and that is why the compositions on sea-anemones will not be published till the next number. Your Uncle Octopus has received two or three very good compositions about these wonderful little creatures, and yet there is a chance for a better one still and a little more time is left, so those of you who mean to try for the prizes can have a week more to do it in, and the compositions must be ready before the 15th of May. They must be written by a boy or girl who is not over twelve years old, and they must not be longer than two hundred words; the best ones will be published in this Journal and prizes will be given for them. Now hurry up, for we are all waiting to hear from you. And now I have some news for you. Soon we hope to have in the Aquarium a real living Octopus, and when you read in the papers that it has come you must all hurry to see it; look at it well and see if it looks like the picture of your affectionate uncle which is here shown, and then examine it carefully and ask questions about it and remember all you see and hear, so that when you are asked to write a composition about it you can do so at once.

While you are waiting for the Octopus to come, you can go to the Aquarium and see the beautiful Japanese fish, whose picture is given in the page before this; you will see that it has a tail like the beautiful Kingiyo and in addition two stalks coming out from the sides of its head, and in the top of these stalks are the eyes. These are the most beautiful and strange fish that were ever at the Aquarium and this came all the way from Japan. They have a queer name also, Ling-Tsing-Yu, and there is only one thing funnier than the name and that is the fish themselves. Perhaps some of you have seen gold fish with three tails, if so, write and tell us all about it, for nothing is more welcome than letters from friends and no one enjoys them better than your affectionate Uncle Octopus.

THAT MISCHIEVOUS YOUNG OTTER.

BY MARGARET EYTINGE.

The otter left his tank one day
And all around went running,
Pretending it was only play
And he was only funning.
He threw the lobsters on the floor
And ate a fat sea-raven.
Quoth he, "I had to do it, for
I felt a great fish-cravin'."
Then in the trough where trout are hatched
Awhile he played the squatter,
Though sleepy Alice Gaitor said
"You know you shouldn't, otter!"

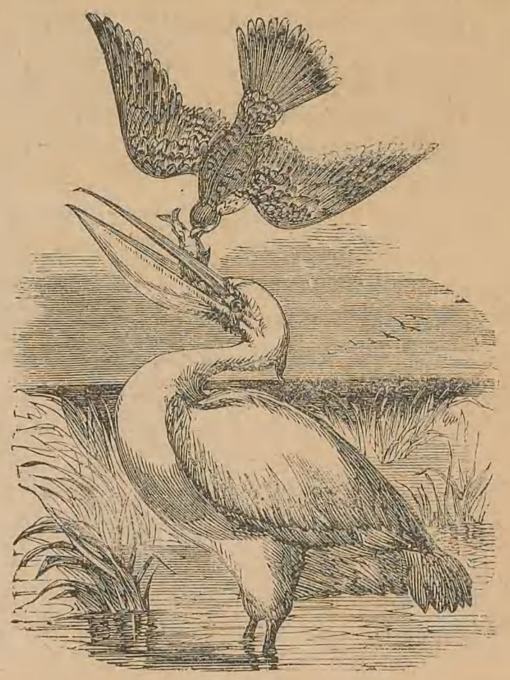
Next on the crabs he made a call.
"We're out," they cried, much flurried;
"Please come some other time," and quick
Into their shells they hurried.
Then to the globe of glass he flew,
Where lived the eyeless cray-fish.
"Just let me in," he slyly coaxed,
"And blind-fish buff we'll play, fish.
I had a friend once from your cave"—
The globe began to totter—
"Oh! go away!" the cray-fish begged,
"We're sure you hadn't, otter!"

By this time learned the otter man
The mischief he was doing,
And all the fishy people ran
To join in his pursuing;
And soon they caught the naughty thing,
And to his tank they bore him;
And while he squealed "What fun I've had!"
A screen they fastened o'er him.
"I scared the crab—I sh[illegible] fish—
I chased that piggy-trotter
The hippo——hippopotamus;"
Said hip—"You didn't, otter!"

* * *

THE BAREFOOT BOY.

Blessings on thee, little man,
Barefoot boy, with cheek of tan!
With thy turned-up pantaloons,
And thy merry whistled tunes;
With thy red lips, redder still
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy—
I was once a barefoot boy.
Prince thou art,—the grown up man
Only is republican.
Let the million-dollared ride!
Barefoot, trudging at his side,
Thou hast more than he can buy
In the reach of ear and eye—
Outward sunshine, inward joy.
Blessings on thee, barefoot boy!
* * * * * * *
Cheerily, then, my little man,
Live and laugh, as boyhood can!
Though the flinty slopes be hard,
Stubble-speared the new-mown sward,
Every morn shall lead thee through
Fresh baptisms of the dew;
Every evening from thy feet
Shall the cool winds kiss the heat—
All too soon these feet must hide
In the prison cells of pride,
Lose the freedom of the sod,
Like a colt's for work be shod,
Made to tread the mills of toil,
Up and down in ceaseless broil;
Happy if their track be found
Never on forbidden ground;
Happy if they sink not in
Quick and treacherous sands of sin.
Ah! that thou couldst know thy joy
Ere it passes, barefoot boy! —*Whittier.*



THE BOASTFUL PELICAN.

One bright sunny morning,
When daylight was dawning,
On the broad sandy banks of the blue river Nile
Was a pelican stalking,
And to himself talking,
With his yellow eyes fixed on the stream meanwhile.

"On all hands it's allowed
I've a right to be proud.
My singular beak above all is preferred,
Then my breast is so white,
And my legs are so bright—
I certainly am a remarkable bird.

My business is good;
I never lack food;
Each morning I feed on my favorite dish.
I am up with the sun,
And my work is begun—
It's the early pelican catches the fish."

Just then his sharp eye
In the water did spy
A little fish swim unsuspectingly through.
"O ho!" said the pelican,
"I am the fellow can
Make a short meal of a fishling like you."

So, like little Jack Horner
Sitting up in his corner,
Mister Pelican watched for the fish to go by;
Then he put in his beak,
Pulled him out with a tweak
And cried, "What a smart bird am I!"

But just overhead
A fish-hawk's voice said:
"Ah, ha, neighbor pelican, what have you there?
Your beak is so long,
And your wings are so strong,
You quite put to shame birds like me, I declare.

Your breast is so white,
And your legs are so bright,
A word for plain folks like myself I must speak:
Then I'm poor and you're rich"—
And at that, with a twitch,
He pulled the fish out of the pelican's beak.

As he winged his way south
With the fish in his mouth,
This piece of advice he let fall as he flew:
"There's many a leak
Twixt the fish and the beak;
Time enough to make boasts when your business is through."

Rachel Farley.

IS IT A BASS OR WHITE FISH?

As the result of the recent introduction of white fish into Otsego Lake, an interesting controversy has arisen between the devotees of the renowned Otsego bass and the more enlightened of our fish culturists. It is doubtless a severe trial for our friends at Cooperstown and the adjacent lake villages, to be compelled to admit that their "bass" is nothing more or less than a white fish, and yet if they are prompted to repudiate this demonstrable fact it may possibly be a consolation for them to know that to other of their countrymen the white fish is held in as high regard as is the so-called "bass" with them. For this reason as well as for the more significant one of identity, there should be no further protest against the introduction of the white fish into the Otsego Lake. These comments are suggested by a recent correspondence which has taken place between Elihu Phinney, chairman of the Fish Commission, and Messrs. Green, Roosevelt and Mather. In directing attention to Mr. Mather's opinion, Mr. Phinney states that "the views of this gentleman are entitled to the highest regard, for he is beyond question one of the very ablest investigators and accomplished practical experimenters that we have in this highly interesting department of science." A commendation such as this and from so distinguished a gentleman reflects credit not only on the gentleman named in it but also on the Aquarium, where Mr. Mather holds the post of Superintendent of Fish Culture. Mr. Roosevelt having endorsed the opinion of Mr. Green that the Otsego bass, so called, and the white fish "are the same fish under different conditions," Mr. Mather also states that a variety of any fish bred in an isolated lake will, in time, divest the local peculiarities, and that this "bass," a thousand years ago, more or less, was identical with the white fish of the great lakes. For this reason Mr. Mather does not fear the introduction of the white fish into the Otsego Lake since it is morally certain that being fed on the same food and subjected to similar conditions, there will soon be a difficulty in distinguishing the difference between them on the table.

A second letter by Mr. Mather suggested by this discussion, contains facts of so great interest not to fish culturists alone but to all those interested in the general subject of which it treats, that we willingly reproduce it for the benefit of our readers. The letter is addressed to Mr. Phinney and reads as follows :

New York, March 12th, 1877.

Elihu Phinney, Esq.—Dear Sir : Your last, of 7th inst., received. In regard to the spelling of the generic name of the white fish, I will say that "Coregonus" is the only way I have seen it spelled by the authorities.

I have not had time to find with certainty its meaning, but I doubt the correctness of the derivation you give from the Latin of "*Con,*" (together) and "*Ago,*" (to lead or drive), thus signifying the fish that go in schools, from the fact that most generic names of fish are from the Greek, and the specific ones are Latin. It may be that it is composed of *korein*—to brush, or sweep, and *Gonos*, seed, progeny, &c. If so, it would imply that the fish has a peculiar habit of sweeping its eggs in some manner. But so do the rest of the Salmonidæ—for the fish in question belongs there, though not to the *ge salmo*, thus :

	Family.	Sub-Family.	Genu
Super Family	Microstomidæ, (*Micro* Small) (*Stomus* Mouth)	Argentininæ	Mallot Osmer
Salmonoidea		Microstominæ	Microstoma. Coregonus. Thymallus.
	Salmonidæ,	Salmoninæ	Salmo. Trutta.

Almost all fish that have two dorsal fins, with the last one composed of fatty matter without rays, are comprehended in this super-family, except catfish, percopsis, &c.

The genera are as follows :

Mallotus—the Capelin—salt water.

Osmerus—the Smelts, two kinds—salt water.

Microstoma—the Greenland Whiting—salt water.

Coregonus—Whitefish—fresh and salt water.

Thymallus—Grayling—fresh water.

Salmo—Salmon and the Trouts.

Trutta, (Marina)—Sea Trout.

Now for the "Coregoni" :

C. Albus, (white,) is the one from the great lakes. The English naturalist, Richardson, says, "probably the best purely fresh water fish in the world."

C. Clupeiformis, (herring-shaped) is the lake herring, a fine fish when fresh, known as "Cisco" when salted, but not identical with the Cisco of Geneva Lake.

C. Nigripinnis, (black fin) from the Upper lakes, particularly abundant in Grand Traverse Bay.

C. Conesii, (after Dr. Cones) from lake near the Rocky Mountains, its upper jaw is prolonged into a skinny appendage.

C. Oxyrhynchus, (sharp-nose) of Gunther, and of which I know nothing.

C Otsego, the "Otsego Bass."

There are other species, but this will show the extent of the genus Coregonus in America—and they are everywhere great favorites. The people of Canandaigua, N. Y., claim for their lake a supremacy over all other white fish, and say that no others will be relished after eating theirs.

You say in your article, that I do not indicate what common name I would give if not "bass." Very true, I do not. It is hard to make a change, and new names sound harshly to the ear, and the tongue is slow to pronounce them.

All the English speaking world unite in calling only those fish "bass" which have spinous rays in the dorsal fin. "Perch" and "bass" are often used for the same fish in different localities. Thus, the "Black Bass" of New York becomes "Black Perch" in other States, &c.

The common names for kindred fish in Europe, are Lavaret, Gwynnaid and Vendace. Some naturalists are fond of multiplying species—making a new one of the smallest differences—and others of condensing, and so simplifying our studies. I have not yet taken up this genus, and do not really know the points of difference claimed.

I find in the report of the Commissioner of Fisheries for the U. S., 1872–3, p. LXXV, the following : "Otsego Lake * * * is tenanted by a fish of the finest quality, called the Otsego bass, (*C. Otsego*), a true white fish, and not yet satisfactorily distinguished from the white fish of the lakes.

DeKay, Nat. Hist. New York, Part 1, Vol. 4, page 248, says that having mislaid his notes, he follows the description of De Witt Clinton, who records the rays of the dorsal fin as nine in number, *three of which are imperfect*. While he gives *C. Albus* as having thirteen dorsal rays.

If I had them in the Aquarium, I certainly would not call them "bass," but would probably say, "Come, look at my *Otsegos*," which would thus become the *Aquarium name* for want of a better.

FRED. MATHER,
Sup't Fish Culture.

GOSSIP ABOUT CRABS.

The body of the worm, the most lowly organized of all the three types of articulated animals (worms, crustaceans and insects), is long and slender, and is composed of rings of equal size, which seem to have about an equal amount of vitality. But in the order of crabs—the *crustacea*—of which I am going to speak, the body is composed of a definite number (21) of rings, gathered into two regions, the front region consisting of the head and body united, called the head-thorax (*cephalo-thorax*), and the after-part or *abdomen*. Look at the body of a shrimp, and you will readily see how distinct these regions are. The rings themselves of crustaceans differ from the simple segments of worms, for here they are no longer soft and pliant, but tough—even shelly—and so joined together as to box up the front region in an immovable case termed the cephalo-thorax. This condition allows but slight motion to the tail, and there can not be said to be any head separate from the thoracic box.

In the limbs we find a gradual change of form and function from the long whiplash-like *antennæ* in front, which curl over the shrimp's back, to short jaws; then, still going backward to jaws that are also used in walking, till, finally, we come to the true feet, which spring from the abdominal segments. Sometimes the jaws are so near like the true feet that the crabs seem to be chewing with their elbows!

The abdomen varies much in shape, being long or short, carried straight behind as in the lobsters and cray-fish, curled under the body as in the spider-crabs, or prolonged into a stiff sword as in the king-crab.

Internally all the organs of motion and sensation are found in the cephalo-thorax, only the intestines and reproductive organs occupying the abdomen. Moreover the nerves are not distributed equally to each segment throughout the body as in worms, but all spring from one or a few centers (*ganglia*) in the front region; so that the abdomen is of much the least value to the animal. And this introduces a principle which acts everywhere in the animal kingdom, and finds its most perfect example in man—the principle of cephalization. This is that the greater or less centralization of parts and functions toward the head is a sign of the higher or lower place an animal fills in the scale of organization.

The Class *Crustacea* is made up of four Orders, namely:

The wheel-animalcules (*Rotifera*).

The parasitic crustaceans (*Entomostraca*).

The fourteen-footed crabs (*Tetradeca poda*).

The ten-footed crabs (*Deca poda*).

The first named are the lowest, are all microscopic, live in the water, and are forever whirling by means of delicate hollow hairs (*cibia*), that serve as hands, feet, mouth, eyes and lungs to them.

The entomostracans are also fitted for an aquatic life, but many are parasitic, and not a few queerly deformed. The barnacles belong here.

The Order of *Tetradecapods* includes crustaceans living both on land and in the water. The "wood-louse" or "saw-bug," found under logs, and the "sand-hoppers" swarming on the ocean beach are familiar examples.

Intermediate between this and the preceding we must put the horseshoe crab of our shores and the Indian ocean, which sometimes is called the king-crab, perhaps on account of its ancient lineage. It is in some respects the most highly organized of all the articulates, and will form a capital subject for your study next summer at the sea shore.

Now we have ascended to the Decapods—the crustacean aristocracy—both beautiful and useful. In the long-tailed species, like the lobster and cray-fish (which is only a fresh water lobster), the abdomen—underneath which the female carries her mass of eggs—terminates in a broad fin, by the aid of which the animal swims; and so powerful is this tail that it is said a lobster can dart twenty feet backwards by one stroke. The forward pair of legs is prolonged into immense claws called *chelæ* or pincers, which they use in all sorts of ways. Behind these are five pairs of stout feet, and in front of them the complicated eating apparatus. Lobsters are artificially cultivated in beds, like oysters, for food.

You may often have been astonished, when just about to pick up a shell upon some sandy beach, to see it suddenly scamper off; and may remember that when you caught it you found a queer little fellow in it that seemed all claws. You had picked up a "hermit" or "soldier crab," with his house on his back. His hinder parts are soft and without the armor of the lobster tribe, although he is well helmeted and gauntleted. So for his protection he backs into an empty spiral shell and holds on, within, by the anchor-like end of his tail, closing up his front door with one of his large pincer-claws. When he gets too big for his castle he goes in search of another. If he meets a brother hermit he offers battle, and either drags him out and appropriates his shell or takes a whipping gracefully.

The true crabs, such as the "spider crabs" and "fiddlers," have no tail at all, or none to speak of, and their whole structure shows that they were intended to walk upon the land or sea bottom. They carry the abdomen curled under the cephalo-thorax, which is here a broad shield covering the whole upper surface, and sometimes very rough and brightly painted. Their eyes are bright enough. and in one group are carried on long eye-stalks.

Considering their armor-like shell we might be puzzled to know how they have room to grow. It is in this way. At certain seasons the entire shell is cast off whole, after great wrenching. A new soft shell has already formed underneath, but the poor crab is nearly defenceless, and so retires to some quiet nook and waits a few days for his new and larger coat to toughen.

Crustacea are abundant everywhere, but especially so in tropical waters, and are invaluable aids in keeping the air and water pure. They are a part of nature's police and scavenger force, for they all, big and little, live on carrion and the other pollutions that, if allowed to remain, would so taint the world as soon to make it unfit for habitation.

ERNEST INGERSOLL.

On the Taking of Food by Aquatic Animals.

In the study of animals, it is sometimes the case that, while having our attention occupied with the principal function of a particular organ, we overlook, or consider but lightly some other functions which belong to it as truly, though they may, when recognized, appear subordinate. Thus the gills of fishes are naturally, perhaps only associated in our minds with the process of respiration in these animals. The truth is, however, that they serve other important uses connected with the taking of food (which, it must be remembered, is an essentially different physical process in water from what it is in air); and the study of these, in which we are aided by the recent observations of a German naturalist, M. Jäger, is highly instructive.

When a fish snaps up an object it first opens its mouth and closes its gill flaps; and opens the gills when it closes the mouth. When it wishes to reject a disagreeable morsel, on the other hand, it first, with closed mouth, opens the gill slits, and enlarges the mouth cavity, then shuts the gill slits and simultaneously opens the mouth. By narrowing the mouth-cavity throughout its length, it now forces out the contents; and in doing so, it is driven a little backwards by the reaction, like a cannon when it is fired.

If we think of it a little more closely, we shall see that, without the gill slits, the fish could not snap up any object, and so could not eat, be- [illegible] to the mouth cavity, would, on closing th[illegible]h, be ejected. The reason is simply this: On opening, the mouth cavity fills with water after the manner of a pump, and the morsel is taken in through suction of the portion of water in which it floats. It can now be held fast in the mouth only if the water finds a mode of exit so narrow that the morsel cannot escape along with it. For this the mouth slit is nowise fitted, for if it be closed, so that a small morsel cannot escape by it, it affords no easy outflow for the water. But the want is fully met by its gill apparatus, which presents a double row of long, narrow slits, each of which is generally a good deal longer than the mouth slit, so that the water can readily flow away without the morsel being carried off along with it.

But again, if a fish were obliged to eject by its mouth the water it had taken up, it would be driven backwards at each bite, and have to expend force wastefully in recovering its ground by swimming, which would be specially disadvantageous in flowing water. On the contrary, however, as the water flows out backwards through the gill slits, the fish receives each time an impulse which drives it forwards, and the maintenance of its position in rapid water is thus rendered more easy.

From these considerations, it becomes possible to explain a number of the arrangements found in aquatic animals, as compared with those which live in air.

Still regarding the finny tribes, we find remarkably large gill slits in fishes of prey; and any one who has watched a pike or a trout in pursuit of its prey, will have noticed how widely it has stretched its gill slits, so as to let the water flow off as freely as possible on all sides If this were at any moment to accumulate in the mouth cavity, the fish's motion would be seriously compromised. It may, with certainty, be said that all fishes with remarkably wide gill slits hunt their prey in long pursuit. Thus, among our fresh-water predaceous fishes, the pike makes the longest pursuit and has the widest gills. As a contrast we might take the gently feeding and nibbling plant fishes, such as barbel, carp, &c., which have narrow gill slits.

A similar difference is associated with the streaming of water. As a fish always snaps with its mouth against the current, it receives more water into the mouth the more rapid the current; and therefore river fishes have in general larger gill slits than fishes which live in still water. Thus, too, may be explained, the remarkable correlation between the width of the mouth slit and that of the gill slits. It is clear, then, that the gills in fishes fulfill an important function in the taking of food, just as truly as lips, teeth, tongue, &c., in higher animals. Now it is interesting to inquire how those animals (amphibia, reptiles, and certain birds and mammals) have been provided for that are without gill slits, and yet seize their food under water. A simple arrangement is that in which the mouth-parts for seizing are long and narrow, so that on the one hand the water has free escape to the right and the left, and on the other, very little water is compressed in the act of seizure. This explains the dagger and knife-shaped bills of all swim- [illegible] on fish, as also the extrem[illegible] dolphin, and the broader indee[illegible] deeply slitted snout of the crocodile.

Another substitute for the gill s[illegible] by certain arrangements in the m[illegible] which either the morsel is sei[illegible] mouth slit is closed for the passag[illegible] which permit the separation of sma[illegible] of the mouth-water. This *role* is pla[illegible] teeth, such as those of dolphins, croc[illegible] laminated bills of geese and ducks, &c., a[illegible] baleen of whales. In these animals may also [illegible] noted a remarkable deficiency of the lips, so that even when the mouth is shut the teeth so to speak remain visible; and there is no outer mouth-cavity. The lips would here only hinder the escape of the water.

With regard to our gill-less amphibia, it may first be remarked that they seize a great part of their food in the air, or (which comes to the same thing) on the surface of the water. If they be observed feeding under water (which indeed is done almost only by newts) their awkwardness in comparison with fishes is very apparent. They cannot bring the morsel at once into their mouth, even though the mouth slit is comparatively large. It may also be noticed that they prefer large morsels, which are seized by the teeth, while yet the mouth slit is widely opened; whereas the small pieces which a fish swallows with eagerness and ease are either disregarded, or the attempt to snap them up fails, the morsel being carried out again by the returning water; this proves that the eating apparrtus of amphibians is better adapted for land than water. This incapability of the newts appears more clearly if one watch the feeding of their larvæ, which are provided with gills. In this stage of its existence the newt seizes its prey with the same rapidity as a fish.

A COMPLETE INDEX OF ALL THE FISH IN THE TANKS.

SPECIAL ATTENTION is directed to the fact that extended changes are now in progress at the Aquarium. As this work will require several weeks for its entire completion, it is deemed advisable to retain the present illustrated plan until a revised one may be made. For this reason the visitor must be content, for the present, with the following catalogue, making such allowance as may be needed, and in our next number a thoroughly revised and corrected index and guide will be given.

SALT WATER TABLE TANKS.

Tank 1.—Now being reconstructed.
Tank 2.— " " "
Tank 3.— " " "
Tank 4.— " " "
Tank 5.— " " "
Tank 6.— " " "
Tank 7.— " " "
Tank 8.— " " "
Tank 9.— " " "
Tank 10.— " " "
Tank 11.— " " "

Tank 12.—Sand, Hermit, Spider and King Crabs.

Tank 13.—Sea Ravens.

Tank 14.—Anemone, *actinia dianthus*.

Tank 15.—Spotted Wrey-mouth, Anemone.

Tank 16.—Anemones, Sponges, and Serpula.

Tank 17.—Sea Urchins, Star Fish, Hermit and Spider Crabs.

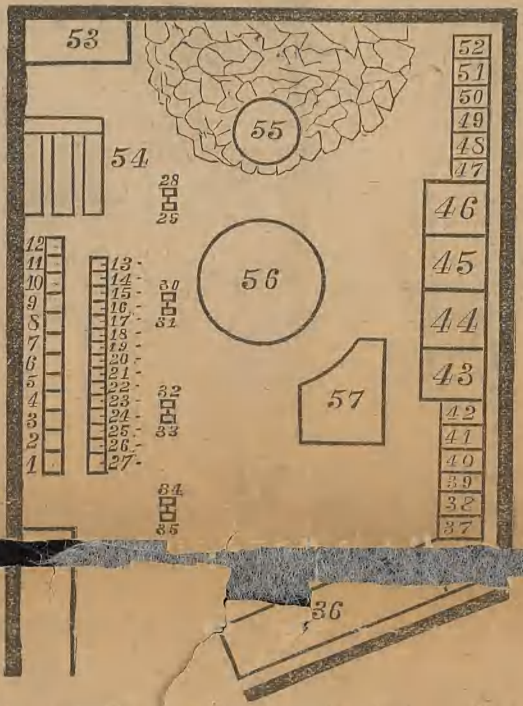
Tank 18.—Po[illegible] Flounders, Toad Fish, Smooth-br[illegible]

[illegible]ESH WATER TABLE TANKS.

[illegible]riple-tailed Japanese Carp.
[illegible]lack Bass, Yellow Pike, Perch.
[illegible]lind Proteus, Lamprey.
[illegible] { *a.* Young Japanese Carp.
{ *b.* Ling-Tsing-Yu.
[illegible]—English Roach and Dace.
[illegible].—Sticklebacks.
[illegible]nk 26.—Common Pond Fish.
Tank 27.—Sturgeon, Yellow Perch.
Tank 28.—Banded Proteus.
Tank 29.—Axolotls.
Tank 30.—Common Pond Fish.
Tank 31.—Brown Cat Fish.
Tank 32—Pickerel.
Tank 26.—Kingiyo.
Tank 27.—Young Salmon.

POST TANKS.

Tank 28.—Sticklebacks.
Tank 29.—Tadpoles, Carp.
Tank 30.—Cat-fish and Carp.
Tank 31.—Algae, Unio.
Tank 32.—Fresh water Lobster, Dace.
Tank 33.—Crimson Spotted Triton.
Tank 34.—Black Headed Dace.
Tank 35.—Coral, Algae.



Ground Plan of the New York Aquarium.

SALT WATER SERIES.

Tank 36.—Spotted Skate, Summer Skate, Spotted Dog Fish, American Codling, Lobster, Sea Bass, Black Fish or Tautog, Ling, Large Surf Bass.

Tank 37.—Porgies, Shells, Coral, Flounders, Anemones.

Tank 38.—Algae, Crabs, Coral.

Tank 39.—Anemones, Sponges, Spotted Codlings, Porgies, Killies, Hermit Crabs, Flounders, Coral, Shells.

FRESH WATER SERIES.

Tank 40.—California Salmon, Lake Trout, Brook Trout.

Tank 41.—Yellow Perch, Brook Pickerel, Blue Cat-fish, Rock Bass, Common Pond fish, Mullett Sucker, Geneva Bass, Rock Bass, White Suckers, Wall-eyed Pike, Spotted Perch.

Tank 42.—Carp, Pearl Carp, Golden Carp, Mottled Carp.

Tank 43.—Brown Cat-fish, Common Cat, Blue Cat, Fresh Water Dog-fish, Lake Sturgeon, Eel, Gar Pike, Pickerel, Common Pond fish, "Seneca Laker," (Localism), Bass, Fresh Long finned Chub Sucker, Wall-eyed Pike, Lake Pickerel, Black Bass, White Fish, Rock Sturgeon.

SALT WATER SERIES.

Tank 44.—Shoal of Striped Bass, Black fish, Sea Perch.

Tank 45.—Deep Sea Cod, Angler.

Tank 46.—Blackfish, Striped Bass, Lafayette, King Crab, Skates.

Tank 47.—Flounder, Tomcod, Toad Fish, Sculpins, Gurnard.

Tank 48.—Lobster, Lady-crab, Edible Crab, Spider Crab, Hermit Crab, Spotted Crab, Lobster.

Tank 4[illegible]—[illegible]d [illegible]ings.

Tank 50.—Rock Cod.

Tank 51.—Black Sea Bass, large Lobster.

Tank 52.—Lobster, Striped Bass, Porgies, Lafayette Fish.

Tank 53.—Brook Trout, Salmon Trout, California Salmon, Kenebec or Atlantic Salmon.

Tank 54.—Fish hatching troughs.

Tank 55.—Sea Lion.

Tank 56.—Alligators,

Tank 57.—Seals.

Tanks not numbered contain the Salamanders, Japanese Turtle, Otters, Bladder-nosed Seal, &c. In certain instances, where a recent removal of fish has been deemed necessary previous to a revision of this list, information regarding its location can be obtained from the regularly appointed assistants, who are constantly in attendance for the sole purpose of answering questions, or from the extra sheet here added.

OUR DRAG NET.

GREEDY MR. GANDER.

BY M. E.

Loud called the goose: "Oh! gander,
Come here, my love, I beg;
I've laid the most enormous
And beautiful white egg?"
"Indeed!" said Mr. Gander,
"That's news I like to hear;
Just tell the cook to boil it
And I will eat it, dear."

Conversation overheard in a barber's:—Barber—"Thin your hair a bit, sir?" Customer—"No, never mind, my wife attends to that; but just oil it well.

FAMILIAR PROVERBS.

HANS KRAUTMANN'S VERSION.

Von stich quick already by der glock vill make dat you don'd shall more os nine all der dime sew.

Id makes noding already ov you schnifel about dot ven der milk bail is out shpilled.

Id ish a sdreet dot ish pooty long ven he don'd vill hav by some dimes dose gorners grooked mit himself.

Dot ish a sick vind ov id don'd by some oder vellars dings blow pooty good.

Ov a mans vill took gare of dem gopper nickels he vill mek dot dem doo dollar pills not vill gone avay by dot same.

Ven der old cat is gone outsides mit herself von der house, dem leedle rats vill all along mit demselfs play yust de same like dot.

Ov a vellare ish got a bird mit his handt already, he don'd vos schmardt ov he let em got avay mit der same price os two ov dem birds by a grapevine dree.

At the marriage of an Alabama widower one of the servants was asked if his master would take a bridal tour. "Dunno, Sah; when old missus's alive he took a paddle to her; dunno it he take a bridle to de new one or not."

A gentleman asked an Irishman why he wore his stockings wrong side outwards. He replied, "Because there's a hole on the other side."